



NORTHSTAR COMMUNITY WILDFIRE PROTECTION PLAN

February, 2015

Provided by

**Northstar Fire Department
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INTRODUCTION

The objective of this Community Wildfire Protection Plan (CWPP) is to reduce or eliminate the loss of life, property and resources caused by a wildfire in the Northstar community. This will be accomplished through public input, planning and forest management practices. The first line of defense against a catastrophic wildfire in Northstar is to prevent as many fires as possible from starting or, in the event of a fire, to keep it as small as possible. The second line of defense is to enforce defensible space requirements around structures and to manage fuels in common and boundary areas by creating firebreaks, safe escape routes and promoting a healthy forest ecosystem.

On December 3, 2003, the Healthy Forests Restoration Act (HFRA) was signed into law. Among other things, this legislation provides statutory incentives for the Forest Service and Bureau of Land Management to give consideration to local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this opportunity, it must first prepare a CWPP.

A CWPP has importance in and of itself because it is mindful of the community values for which it is formulated. However, since a CWPP includes the interests of all groups and addresses a broad range of issues, it inevitably specifies a well-defined fuel management program and public safety concerns. An example of these benefits is provided in Appendixes E and F. This CWPP will expand and update the Northstar Fuels Management Plan and the original CWPP adopted in 2005. Since its inception, the CWPP has significantly increased protection from wildfire for the Northstar community.

METHODOLOGY

Northstar Fire Department used the following approaches to assess and document both the risks and hazards in its community and the surrounding lands. This assessment used the latest satellite-based mapping technology and field verification provided by Private Foresters, California State Foresters, California State Fuels Management Specialists and Northstar Fire Department Fire Chief and Forester. This methodology quantifies current risks and hazards, documents risk and hazard abatement to date and provides proposed mitigation costs and timelines for future mitigation efforts. The assessment methodology was uniformly applied to both public and private land parcels within and outside Northstar community boundaries.

In developing the CWPP for the Northstar community, all previously collected data, analysis, plans, maps and reports were used to the fullest extent possible. Northstar Fire Department has made every attempt to work closely with the general public, major private landowners, local fire agencies, regional government and the state and federal agencies whose properties or jurisdiction have any possible impact on this plan. Public meetings have been held to communicate this methodology as well as to solicit public input.

Northstar Fire Department intends for this CWPP to reflect the community's values, needs, environmental concerns and opportunities within this plan's boundaries and to be effective in reducing the wildfire threat to the Northstar community.

COMMUNITY PROFILE

History

In 1972, the Northstar Fire Department was formed as a Placer County Services Area governed by the Placer County Board of Supervisors. In 1991, the Northstar Community Services District was formed as an independent district within Placer County; a five-member board governs the district. The five board members set district policy and a general manager manages the district. The district provides fire protection, water, sewer, road maintenance, snow removal and recreational services.

Topographical Factors

The Northstar Community Service District is located in the Sierra Nevada mountain range at the east end of Placer County. The community of Northstar is in a classic Wildland/Urban Interface area (WUI), which adds responsibility and demands to both structural and wildland firefighting. If the district experiences multiple calls, the limited resources are severely taxed. County roads are at times closed for snow-clearing operations and repairs in the spring and summer. Northstar is a popular year-round visitor destination, which causes traffic congestion and could prevent firefighting equipment or medical-emergency personnel from responding in a timely manner.

Climate

Northstar and its surroundings can experience in excess of 200 inches of snow with annual storms that bring rain, ice and snow. The summers are typically warm and dry with thunderstorms that cause lightening. The likelihood and ease of combustion becomes greater as the average temperature increases and the humidity decreases. Wet winters encourage the growth of vegetation, which dries during the summer and creates hazardous fuel conditions.

SERVICES AND STAFFING

The Northstar Community Services District is approximately 2.9 square miles with a sphere of influence of approximately 25 square miles. The Northstar Fire Department provides structural and wildland fire protection, fire suppression, fire prevention and public education. The Fire Department also provides emergency medical services at the Advanced Life Support level (Paramedic). The Northstar Fire Department is a provider and recipient of mutual aid throughout the Truckee/North Tahoe region. The forested lands within and surrounding Northstar are considered State Responsibility Area [SRA] and Federal [DPA] Direct Protection Area lands which means wildland fire protection falls within the purview of Cal Fire or the United States Forest Service [USFS].

The Northstar Fire Department has sixteen full time shift personnel, one full-time Fire Chief, one Fire Prevention Officer and a Forester. There are three total shift platoons to provide 24/7 staffing every day of the year. The Fire Chief, Fire Prevention Officer and the Forester works a 40-hour work week.

The Northstar Fire Department currently has two fire stations, one aerial ladder truck, three type one engines, two type three engines, one command vehicle, one utility/rescue vehicle, two snowmobiles and various snow removal equipment to assure seamless services during the winter months.

Past and Future Growth

Development started in the Northstar area in the early 1970's, with the first homes completed in 1972. Development has had both positive and negative effects on the forest itself and on the potential for wildfire. Exhibit 1 is a detail map of the Northstar CSD boundaries, including property ownership details. The potential for the increase of fires has been further intensified by having an increased amount of people recreating in the forest. In addition, with the introduction of residential and commercial property within forested areas, structure protection has taken a priority over fire suppression. This allows wildland fires to grow in intensity until enough firefighting resources can arrive to start suppressing the actual wildland fire. On the positive side of development, the construction of roads has increased access within the forest and the availability of water for fighting fire has been expanded. Early detection of fire has improved with people present in the forest and with cell phone technology. With adequate funding, agencies also have the ability to manage forest fuels properly and to provide for a healthy fire resistant forest ecosystem.

In 1999, the year of the first Fuels Management Plan, the total built square footage, including commercial buildings, comprised of 2,320,857 square feet. For 2015, that number has nearly doubled in size. With this area being a high profile destination resort, increased interest in year-round recreation increases, thus increasing the susceptibility for a wildfire. The infrastructure to support this development has created the need for additional planning and mitigation through the CWPP process. Some of the mitigations include an additional fire station and staffing, aggressive fire protection ordinances and the addition of a Forester to manage all forestry related programs.

FOREST HISTORY IN THE NORTHSTAR AREA

Fire

Northstar is located in a fire-dependent ecosystem. Fire over thousands of years in the Sierra Nevada has shaped the local forest in its structure and composition. Natural fires caused by lightning and fires set deliberately by Native Americans for cultural practices, have molded the forest in this region before the settlement era started. These fires, which were frequent and light in intensity, removed the fuel that had accumulated on the ground since the last fire. Early accounts from the first settlers talked about a forest that was predominately an open-growth pine forest with large trees and little or no understory. Through the general absence of fire by suppression efforts and little use of controlled burning over the past century, the forest has evolved into an unnatural state. We now live in a forest that is overstocked with a larger component of red fir (*Abies magnifica*) and white fir (*Abies concolor*) and a dense understory of seedlings, brush and downed woody material, namely: a forest that is ready to burn.

Fire Occurrence

Carol Rice of Wildland Resource Management in Donner State Park has completed a fire history report just to the west of Northstar. Her report was created by carefully studying the cross sections of selected older trees and noting the years in which the trees were fire scarred. This was made possible because every year a tree grows a new ring of wood around the circumference of the stem, just under the bark. During the growth cycle, trees will grow quickly during the spring, making a light colored, less dense ring around the previous year's wood. During late summer and early fall, a darker dense ring forms outside the spring-growth ring. This growth pattern creates annual rings and allows us to determine the age of a tree and the year a fire damaged a tree. Carol Rice's report showed that between 1635 and 1900 fire occurred in the area of the park an average of every 9.1 years. This average can be applied to the whole Truckee/Northstar area.

Logging

Logging started in the Truckee area sometime in the late nineteenth century. Two separate mills began operations in the vicinity of the Trout Creek area. A timber survey completed during the summer of 1912 stated that most of the flat ground draining into Trout and Alder Creeks had been "logged over some years ago". It also pointed out that the early logging consisted of predominantly removing pine species and leaving a residual forest consisting mostly of young red and white fir trees.

Historical logging has changed the composition and size of the trees in the forest in the Northstar area. Before logging, the forest was dominated by Jeffery pine (*Pinus jeffreyi*) on the south slopes, a mixture of older pine and an understory of fir in the flat land and a mix of pine and fir trees on the north slopes. Today's forest within the Northstar Community consists of a greater percentage of red and white fir over pine. Where the ground has been disturbed by logging or fire, a disproportionate amount of lodgepole pine within wet areas (*Pinus contorta*) have been left to flourish.

CURRENT FOREST CONDITIONS IN CWPP AREA

Forested Areas

Without proper management and with the loss of the previously mentioned periodic light and frequently occurring, low-intensity natural fires, the forest has developed into an unhealthy state. Through selective logging of the Jeffery pine before the turn of the century and the near absence of fire in the last 100 years, the conifer species composition has changed and there has been a buildup of understory brush and accumulated dead fuels. Early logging removed the larger and genetically superior pine trees, leaving the understory of predominantly fir and genetically inferior trees to become the new forest over-story. The forest now consists of a greater percentage of tree species that are less tolerant to drought conditions, beetle infestations and fire. The forest also contains a high number of trees per acre, leaving them in competition with each other for water, nutrients and sunlight. This leaves them very susceptible to insect attack during drought years.

Brush Covered Areas

Brush fields create conditions that cause a wildfire to move very quickly and burn at a high intensity. Typically, two to five-foot tall manzanita dominates the southwestern slopes of the district. If left unmanaged, the brush will continue to grow and will create its own litter layer, increasing the rate of spread and intensity of a wildfire. Brush inhibits or greatly reduces the growth of native tree seedlings. In general, when brush fields are overgrown and continuous in nature, they inhibit tree growth by taking away or limiting available water nutrients and sunlight.

Treated Areas

Where fuels-reduction work has been completed, annual inspections and maintenance needs to be performed. In most cases, shrub-covered areas were reduced from a severe to dangerous fire threat to a manageable fire threat. Timber-covered areas, in most cases, were reduced from an unhealthy even-aged conifer stand with accumulated forest floor fuels to what is classically called a Shaded Fuel Break. A detailed breakdown of fuels treatments and the classification of a computer generated forest fuels model are described on pages 5 through 7.

COMMUNITY RISK ASSESSMENT

Fuel Models and Definitions

Fuel models describe vegetation in terms of firefighting. Each fuel model is characterized by the amount, size and depth of fuel. Fuel models, along with fuel moisture, live fuel moisture, slope of ground and wind speed and direction are used to predict what a wildfire will do and is otherwise known as fire behavior. Fuels are classified into four groups: grasses, brush, timber and slash. The following is a brief description of the 13 fuel models.

Model Groups

Grass Group

Fuel Model 1	Open grasslands with less than a third of the area covered by shrub and timber. The grass generally does not grow higher than one foot
Fuel Model 2	Grasslands with one-to two-thirds of the area covered by shrubs or timber. The grass generally does not grow higher than one foot.
Fuel Model 3	Grasslands with grasses averaging three feet in height.

Shrub Group

Fuel Model 4	Stands of mature brush six feet high with a deep layer of litter. Flammable brush, with dead, woody material present.
Fuel Model 5	Stands of young brush two feet high with little or no dead material.
Fuel Model 6	Intermediate-aged stands of brush approximately two and a half feet high. This fuel model is rated between Fuel Model 4 and 5 for flammable brush.
Fuel Model 7	Highly flammable green foliage between two and six feet high.

Timber Group

Fuel Model 8	Closed-canopy stands of timber with a surface layer of needles and twigs.
Fuel Model 9	Closed-canopy stands of timber with more material on the surface layer than Fuel Model 8.
Fuel Model 10	Closed-canopy stands of timber with large quantities of dead fuel on the surface layer.

Logging Slash Group

Fuel Model 11	Associated with thinning operations. A light fuel load approximately one foot deep, with an over-story of green trees.
Fuel Model 12	Landscapes dominated by three-inch-diameter slash approximately two feet deep.
Fuel Model 13	A continuous layer of slash with larger quantities of material greater than three inches. The fuel depth is generally three feet.

Risk Assessment

BEHAVE is a computer program that predicts the behavior of a given fire. The inputs for fire behavior, as discussed under the section “Fuels and Definition,” are entered into the computer and the outputs are described by the rate of fire spread in feet per hour, flame length in feet and the fire line intensity in BTU per foot per second. This information allows firefighters to predict how fast a fire will move, what type of equipment should be used and which tactics should be used in fighting the fire.

To show graphically how much area would be consumed by a fire under normal conditions, the map labeled “Exhibit 2” was developed. The map shows how far a fire would travel in one hour without fire suppression efforts. The conditions for the exhibits include a live woody fuel moisture content of 75 percent, average slopes of 35 percent and wind direction from the southwest with a wind speed at mid-flame of the fire at 10 miles per hour. Exhibit 2 on page 17 depicts the fire scenarios.

Exhibit 2 shows the fire behavior in Fuel Model 4 in yellow and Fuel Model 5 in red. Note that in Fuel Model 4 the predicted fire would travel a little over 3 miles in one hour and would produce 38-foot flame lengths, consuming 1,710 acres. The rate of spread would be slower once the proposed fuel reductions treatments are complete. Using the BEHAVE program and a Fuel Model 5 with a 10-mile-per-hour wind, a fire would travel only 5,280 feet, or one mile, in one hour. The fuel model demonstrated that when un-treated, open brush-fields can pose an extreme fire hazard to the Northstar community because of the potential for rapid fire spread. This CWPP recommends regular brush maintenance scheduled in a timely matter according to their position in slope, aspect, species and growth rate.

Exhibit 2 also shows a timber fire in Fuel Model 10 in orange and Fuel Model 8 in blue. That fire would have an extreme resistance to control because of the tree crown clusters and the volume of fuel on the forest floor. Exhibit 2 further shows a fire in the same timber stand where fuel reductions have taken place. The fuel reductions would change the Fuel Model from 10 to 8 and the resistance to fire control would change to low. Using the BEHAVE program and a Fuel Model 10

with a 10-mile-per-hour wind, a fire would burn 2,046 feet in one hour. However, if we modify the fuel in these areas by thinning the trees, removing the fuel ladders and removing the downed woody material and brush, (reducing the Fuel Model to an 8), the same fire would cover 462 feet in one hour, making it easy to extinguish. Although timber fires move slower than brush fires, the bulk of the homes within Northstar are located in timbered areas and are susceptible to this type of fire. In the threat zone, the fuels need to be modified and maintained to reflect that of Fuel Model 8. This quarter-mile-treated threat zone will allow a crowning timber fire to drop to the ground and allow engine crews to extinguish it. The Cone Fire case history as shown in Appendix D supports this recommendation.

Fuels Model Summary

The untreated vegetation in the Northstar CWPP generally falls within two different fuel models: timber and shrub. However, it is possible to have a combined fuel model, for example, a fuel model 5 combined with a fuel model 8. Typically, vegetation within the Northstar community is a timber model 8 or 9 and shrub models 5 and 6 (See pages 5 and 6 for reference).

The shrub-covered areas are mostly dominated by Fuel Model 5 within the defense zone (See Exhibit 3 on page 18). If the brush fields are allowed to mature over time, they will reach the definition of a Fuel Model 4.

There are limited areas of a Fuel Model 4 mixed within the defense zone, and there are heavier concentrations of Fuel Model 4 within the threat zone (See Exhibit 4 on page 19) extending to the Northstar Community Services District boundary.

Fuel Model 8 now dominates the timber-covered areas within the defense zone. There are many areas of Fuel Model 10 within the threat zone extending to the Northstar Community Services District boundary.

HAZARD PRIORITIES

In 1999, the Northstar Fire Chief Mark Shadowens and CWPP Project Coordinator Dave Briscoe, along with the respective foresters from NPOA, Booth Creek Ski Holdings and Cal Fire, initially surveyed the areas that pose a threat to the Northstar community to determine what should be done to reduce the fire hazard in those areas. The initial survey yielded six specific determinations. These are the 6 original Hazard Priorities identified:

Priority No. 1 - Complete and maintain fuel reductions in those areas identified as the defense zone in Exhibits 3 and 4. This goal represents a completion of the 1999 Fuels Management Plan. Fuels maintenance within the defense zone is a part of this priority. This will be accomplished through continued enforcement of Northstar Community Service's District Ordinance 26-09.

Priority No. 2 - Perform fuel reductions work in the adjacent Army Corps property at the end of Basque Drive, as identified in Exhibit 4. This property is located within the defense zone boundary. This proposed project is within the Martis Valley Wildlife Management Area and it is not known what may be required for environmental review processes.

Priority No. 3 - Complete the fuels reductions identified in Exhibit 4 as the U.S. Highway 267 south corridor. This will preserve an escape route and help prevent a fire from starting in this corridor and burning into the Northstar community. In 2004, we have had two fires in this corridor.

Priority No. 4 - Complete fuels reductions within the area identified as the west side threat zone in Exhibit 4. This area has been identified as the first area within the threat zone to receive treatment because of the fuels and topography. This area poses the most immediate threat within this zone.

Priority No. 5 - Create a shaded fuel-break system within the threat zone identified in Exhibit 3. It may be of variable width, due to vegetation types, slope, prevailing winds, terrain features, access and likely fire start-areas.

Priority No. 6 - Strategically remove dead trees as needed within the CWPP area to promote forest and watershed health, and to identify and perform maintenance as needed. The CWPP area extends 1.5 miles in any direction from any developed area.

Updates to Hazard Priorities since their Establishment, (2009-2013)

Original Priority No. 1 - Complete and maintain fuel reductions in those areas identified as the defense zone in Exhibits 3 and 4. This goal represents a completion of the 1999 Fuels Management Plan. Fuels maintenance within the defense zone is a part of this priority. This will be accomplished through continued enforcement of Northstar Community Service's District Ordinance 26-09.

Priority No. 1 Update - This on-going work has reached a desired level of fuels management treatment to fulfill the priority. Future grants and the Northstar CSD/NFD homeowner initiative, "Measure E," will allow ongoing work to be done in order to maintain the priorities objective.

Original Priority No. 2 - Perform fuel reductions in the adjacent United States Army Corps property at the end of Basque Drive, identified in Exhibit 4. This property is located within the defense zone boundary. This proposed project is within the Martis Valley Wildlife Management Area and it is not known what may be required for environmental review processes. The minimum cost for this project is estimated at \$25,000 for fuels management.

Priority No. 2 Update - For 2014, a California Fire Safe Council, which is a federally funded grant project, was awarded to complete fuels management work adjacent to the neighboring United States Army Corps property. Initial cost estimate treatments have exceeded the original \$25,000 estimate due to increased mortality and accumulated fuels since the initial assessment; however project work will leave forested adjacent to the Army Corps property in a management condition. On-going discussions have been in place to assist in getting the Army Corps property treated, and no future treatments are in place.

Original Priority No. 3 - Complete the fuels reductions identified in Exhibit 4 as the U.S. Highway 267 south corridor. This will preserve an escape route and help prevent a fire from starting in this corridor and burning into the Northstar community. In 2004, we have had two fires in this corridor. Cost is estimated at \$96,000 for fuels management.

Priority No. 3 Update – Developers within the community of Northstar have paid for a major portion of this corridor to be treated. Future treatments leading into maintenance is needed, however newer priorities will take precedence.

Original Priority No. 4 - Complete fuel reductions within the area identified as the west side threat zone in Exhibit 4. This area has been identified as the first area within the threat zone to receive treatment because of the fuels and topography. This area poses the most immediate threat within this zone. The cost is estimated at \$270,000 for fuels management.

Priority No. 4 Update – Approximately 90% of this work has been completed, however the remaining 10% to complete is adjacent to a small portion of residences and in the southwest portion of the district's boundary. These remaining areas have been identified for treatment in future grant funding options and will be listed in the upcoming Management Plan.

Original Priority No. 5 - Create a shaded fuel-break system within the threat zone identified in Exhibit 3. It may be of variable width, due to vegetation types, slope, prevailing winds, terrain features, access and likely fire start-areas.

Priority No. 5 Update – Within the District, the 300' Defense Zone has a shaded fuel break established and now be considered in maintenance mode. Shaded fuel breaks created in the ¼ mile threat zone have been established within the district boundary but limited outside the district boundary. The quarter mile threat zone required treatment outside the district boundary, needing a working relationship with adjacent landowners. Some adjacent landowners have performed work meeting the District's goals; however other landowners have their own objectives or other financial obligations to make this priority 100% successful. During the development of this priority in the original CWPP document, this priority was a generalized priority.

Original Priority No. 6 - To strategically remove dead trees as needed within the CWPP area to promote forest and watershed health and to identify and perform maintenance as needed. The CWPP area extends 1.5 miles in any direction from any developed area.

Priority No. 6 Update- Annual work is expected to meet this priority. Tree mortality is inevitable and in recent years has been accelerated due to reduced amounts of precipitation and an increase in insect and fungal attacks. Continual maintenance work within the CWPP boundary will help slow down the mortality rate and provide additional spacing and improve overall forest health. Annually, a dead/diseased and dying tree list is created and dedicated work for this priority has been assigned.

Amended Priority No. 7 – This Priority established in 2009 recognizes areas outside the 1/4-mile threat zone as a priority for treatment. These areas are shown in Exhibit 6 and in some cases may be located outside the NCSD boundary and adjacent to neighboring property owners. Some of these outlying areas have been proposed for work through recent Federal Funding Requests. The benefits of treating areas outside the district boundary will statistically reduce the chances of a catastrophic wildfire and allow treatment in areas that are limited or restricted in access by ground equipment.

- Estimated costs are based on rates provided by a Registered Professional Forester.
- Designation of project boundaries, tree marking, designation of archeological sites, wetland and watercourse boundaries, supervision of a chipping crew at \$145 per acre.

- Since the writing this CWPP, the average cost for removal of timber has increased \$928 to \$1,184 per acre and an average cost for removal of heavy dense brush fields is \$2,500 per acre by hand crew and \$1,100 - \$1,300 per acre by a mastication machine.

Priority No. 7 Update – Fuels treatment work outside the NCSD boundary remains a priority and following the 2011 CWPP update, Northstar California, (Vail Resorts) has completed a federal grant for project work that is located outside the 1/4-mile threat zone to the southwest of the district. This work allowed a significant fuel break to be established in remote territory to the southwest of the district boundary. In 2010, Northstar California treated approximately 100 acres and in December, 2012, they created a document identifying areas within and outside the district boundary that future grants will focus on.

2014 Identified Hazard Priorities

Included in this update is a new list of Hazard Priorities identified by the Northstar Fire Chief, Mark Shadowens and Forester, Joe Barron. These 6 new Hazard Priorities have been created since the majority of the past seven Hazard Priorities have been completed.

Priority No. 1 – Complete fuels management work in the area identified as Porcupine Hill which lies in the northeast portion of the district along U.S. Highway 267 and the Northstar Golf Course. Ongoing work has been to establish a 300’ buffer zone from the highway and to eventually treat the entire property.

Priority No. 2 – Create a shaded fuel break in the eastern portion of the district boundary from the residential area of Beaver Pond moving north towards U.S. Highway 267. Past project work has strengthened the eastern boundary and this remaining portion will create a sustainable fuel break between the district boundary and Northstar Drive.

Priority No. 3 – In the south portion of the district lies 90+ acres of forested land that requires fuels treatment beginning above the Northstar Village to the top of Highland’s View Road. The Big Springs Gondola which travels from the Northstar Village to Mid Mountain lies within this priority area.

Priority No. 4 – Create a 500’ buffer zone south of the Northstar Property Owners Association, (NPOA) Recreation Center and east of the Ski Trails Condominium Association Complex. Future work in the Northstar Fire Department’s Management Plan will work beyond the 500’ buffer zone.

Priority No. 5 – Work in a partnership with the United States Army Corps of Engineers on a fuels management project on their property located in the northwest corner portion of the district. Fuels reduction has been completed on the district side; however extensive work in the neighboring property is needed.

Priority No. 6 – To continue strategically removing dead, diseased and dying trees within the CWPP area to promote forest and watershed health and to identify and perform maintenance where needed. The CWPP area extends 1.5 miles in any direction from any developed area.

STATE AND LOCAL LAWS AND ORDINANCES AFFECTING THE MANAGEMENT OF FUELS ON PRIVATE PROPERTY IN NORTHSTAR

State Fire Laws

California Public Resources Code, PRC-4291 and Title 14 of the California Code of Regulations CCR, subsection 1299 list items that must be maintained around the home to lessen fire hazard. PRC-4291 states that: A person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material, shall at all times do all of the following:

1. Maintain defensible space no greater than 100 feet from each side of the structure, but not beyond the property line unless allowed by state law, local ordinance, or regulation and as provided in paragraph 2), below. The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location and type of vegetation. Fuels shall be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. This paragraph does not apply to single specimens of trees or other vegetation that are well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Consistent with fuels management objectives, steps should be taken to minimize erosion.
2. A greater distance than that required under paragraph 1, above, may be required by state law, local ordinance, rule, or regulation. Clearance beyond the property line may only be required if the state law, local ordinance, rule, or regulation includes findings that such a clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. Clearance on adjacent property shall only be conducted following written consent by the adjacent landowner.
3. An insurance company that insures an occupied dwelling or occupied structure may require a greater distance than that required under paragraph 1, above, if a fire expert, designated by the director, provides findings that such a clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. The greater distance may not be beyond the property line unless allowed by state law, local ordinance, rule, or regulation.
4. Remove that portion of any tree that extends within 10 feet of the outlet of any chimney or stovepipe.
5. Maintain any tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood.
6. Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

There are informative pamphlets, literature and Internet sites as references available from the Northstar Fire Department (530-562-1212).

Local Fire Ordinances

An Ordinance adopting the 2010 California Fire Code and an emergency response impact for fire suppression and emergency services; prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials or explosion; providing for the issuance of permits for hazardous uses or operations; and authorizing the establishment of a bureau of fire prevention and providing officers therefore and defining their powers and duties; and furthermore, adopting those amendments to the 2010 California Fire Code as stated herein.

Ordinance 26-09 (Appendix B) is a Wildland Fire Prevention Ordinance which, among other things, acknowledges the state designation of the Northstar community as a very high fire severity zone. This ordinance classifies lands within the Northstar Community Services District (NCSD) for fire hazard as residential and commercial parcels, defensible forest and fuel reduction zones; sets maintenance standards and defines penalties.

These ordinances support the Northstar Fuels Management Plan which was originally prepared in 1999 and the CWPP which was officially signed into effect and adopted in July 20, 2005. Amendments to these ordinances will be necessary over time based on information gathered and priority work that has been completed.

STRUCTURAL IGNITABILITY

To address issues related to the ignitability of structures within the Northstar community, ordinances have been adopted, sections have been added and procedures have been put into place, as follows:

The NCSD Ordinance 28-13 (Appendix C) adopts the 2013 California Fire Code and an emergency response impact for fire suppression and emergency services. This fire code establishes minimum standards for protection of life and property from fire, explosion and hazardous materials release.

NCSD Ordinance 26-09 (Appendix B) expands the scope of Public Resources Code 4291 and 14 CCR 1299. Code 4291 mandates that field inspections are performed annually by the Northstar Fire Department to ensure that the community is 100 percent compliant with these regulations. This ordinance allows the NCSD to classify lands within the community for fire hazard, to set maintenance standards and to define penalties. This ordinance also allows the enhanced provisions of this CWPP to be implemented, thereby reducing structural ignitability.

Additional recommendations (Appendix F) pertaining to eaves and balconies, exterior walls, rafters, windows, doors, attic ventilation openings and under-floor areas as found in the current version of “**Structural Fire Prevention Field Guide for Mitigation of Wildfires**” will be made available through public education, with the help from the Northstar Fire Department and the NCSD.

FUELS MANAGEMENT METHODS

Pile Burning

This method involves the use of creating piles of manageable sizes when the material cannot be effectively hauled away or chipped. It is a cost effective method where the material is strategically stacked in open areas, thus minimizing scorch to residual trees.

Once stacked, the pile is then left to cure, covered with burnable material enabling a dry portion of the pile and burned when weather conditions allow. Pile burning normally takes place between late fall through early spring. The Northstar Fire Departments protocol is pile burning when appropriate conditions allow, such as smoke dispersion, precipitation levels and population density during burning operations.

Tools for pile burning include fire gel (Aluma-gel), 1-2 drip torches consisting of a mixture of diesel fuel and gasoline to ignite the pile. Once the pile is ignited, a person supervises one to 5 piles, consistently keeping the pile burning and ensuring 100 percent consumption.

Placer County requires that a Burn Variance be submitted through the Prescribed Fire Information Reporting System, (PFIRS) and approved prior to pile burning. This burn variance requires a well-thought-out strategy to pile burning, taking into consideration public and government notification, atmospheric conditions and possible adverse effects to the local and adjacent communities. A nominal fee is included to obtain an air-pollution permit from the local air quality control board.

Weather conditions depending, a four-person crew can burn approximately 25-50 piles within one acre for \$928. Additional expenses such as drip torch mix, Aluma-gel and next day pile consolidation and mop-up can bring the average cost to burn up to \$1,100 per acre.

Mastication

Mastication is completed by large and small machines with rotation heads which chew the vegetation or slash in place. Hydro Axe, Trac Mac and Shar are a few of the well-known models. These machines run either on wheel, for slopes of up to 20 percent, or on tracks, for slopes of up to 35 percent. The cutting heads are either a spinning disc with blades or a rolling drum with blades. The cutting heads are capable of little or no-side-to side movement. The rolling-drum type is capable of cutting closer to the ground and tends to be safer by not throwing pieces in all directions. Another type of machine is the Slash Buster. It is a tracked excavator with a rotary cutting head attached to the boom. It is capable of sitting in one place and cutting in all directions. The Slash Buster can be used on slopes of up to 40 percent. Tracked versions of masticators are known to have low pounds per square inch (P.S.I.) rating. For example, a John Deere masticator (350 excavator) which has a service weight of 76,557 pounds and equipped with extra wide track pads can have a P.S.I. ground pressure rating of 6.1. Topography and material depending, excavators can masticate an acre of land at an average of \$1,100-\$1,800 per acre.

Brush Clearing and Thinning by Hand

This method uses 4 to 6 person crews equipped with chain saws, brush cutters and pole saws. Hand crew work includes the thinning and limbing of trees, cutting of brush and dead material/ground fuels. Hand crew biomass disposal method range from chipping, pile burning and hauling.

The cost per acre varies depending on the project site, level of treatment and the method of biomass disposal. Hand crew costs can range from between \$928 to \$1,184 per acre.

Logging and Biomass Operation

Logging and biomass operations can be used to thin trees and brush within common areas and forested areas. Logging and biomass operations are market-dependent and can at times create a profit. Creating a profit or loss for a biomass operation can also depend on the size of the trees being removed and the quality of the material. A biomass operation can use equipment such as a feller/buncher to grab a selected tree and cut it two to three inches above the ground. The trees are then pulled to a location where, if the trees are small, they are chipped to create “hog fuel” for a co-generation plant. Larger trees are cut into logs for timber or firewood. After the logging operation, crews will cut brush, pile logging slash for burning and cut the lower limbs on remaining trees to reduce ladder fuels. Other operations can be done by means of a hand crew, a chipper and a tub grinder. Since 2009 it has not been feasible for fuels management operations to utilize either of these methods. Long distances to the mill for timber and or biomass involve a high cost for hauling and defeat the purpose of air quality/carbon sequestration goals. In addition, low timber prices, low volumes of timber to extract and no local biomass facility have impacted these options. Currently, biomass operations have been funded by grants which allow biomass from tub grinding operations to be hauled locally for erosion control projects.

STANDARDS

The brush fields within the CWPP area must be modified to produce flame heights of no more than 4 feet. Following fuels treatment work, ongoing maintenance must be in place with a schedule of re-entry based on the vegetation type. For example, a brush field on a south facing slope may require re-entry in 3-5 years, whereas a bush field on a north facing slope may require re-entry in 5-8 years.

Timber stands must be thinned based on stand density requirements pertaining to slope aspect and historical species components. Historically, for this portion of the Sierra Nevada, stand density requirements based on species components is recognized:

- 50-90 square feet of basal area for pine species stands
- 75 square feet of basal area for mixed conifer stands, (generally a pine and true fir mix)
- 75-90 square feet of basal area for a true fir stand

This activity should cover an area of not less than 300 feet abutting structures, safety zones and escape routes. This area is referred to in the CWPP as the Defense and Threat Zones as shown in Exhibit 3 on page 18.

FUELS REDUCTION AND MAINTENANCE PLAN

Fuels treatment will be implemented based on the priorities established in this CWPP. Preferred treatment options will be pursued based on information provided by the Fire Chief and the Forester assigned to each management area, priority level and scheduled maintenance, as funding is available. Once the fuels reduction zones have been treated, fuels will start to build up again. All of the areas within the project boundary will need to be monitored and treated periodically to maintain the 300-foot defense zone and 1/4-mile threat zone and to maintain secure safety zones and escape routes as identified within the CWPP. Additionally, the 1-1/2-mile CWPP perimeter project boundary will need to be treated for fuels reduction and to address healthy forest concerns.

An ongoing, running database with an assigned polygon for each project within the CWPP has been developed. The basic information includes, fuel model, stand density, treatment history, cost projections and actual treatment costs. This includes current fuels conditions and the next scheduled treatment date. Database records will be kept giving a history and description of the work and level of intensity completed in each project area. Priorities for maintenance within the project areas will mirror those established in the project priorities.

Funding for the work needed to be performed, as identified within the CWPP, may come from many sources. Funding sources will need to be established for each individual project.

EXHIBIT 1 – LAND OWNERSHIP DETAIL MAP

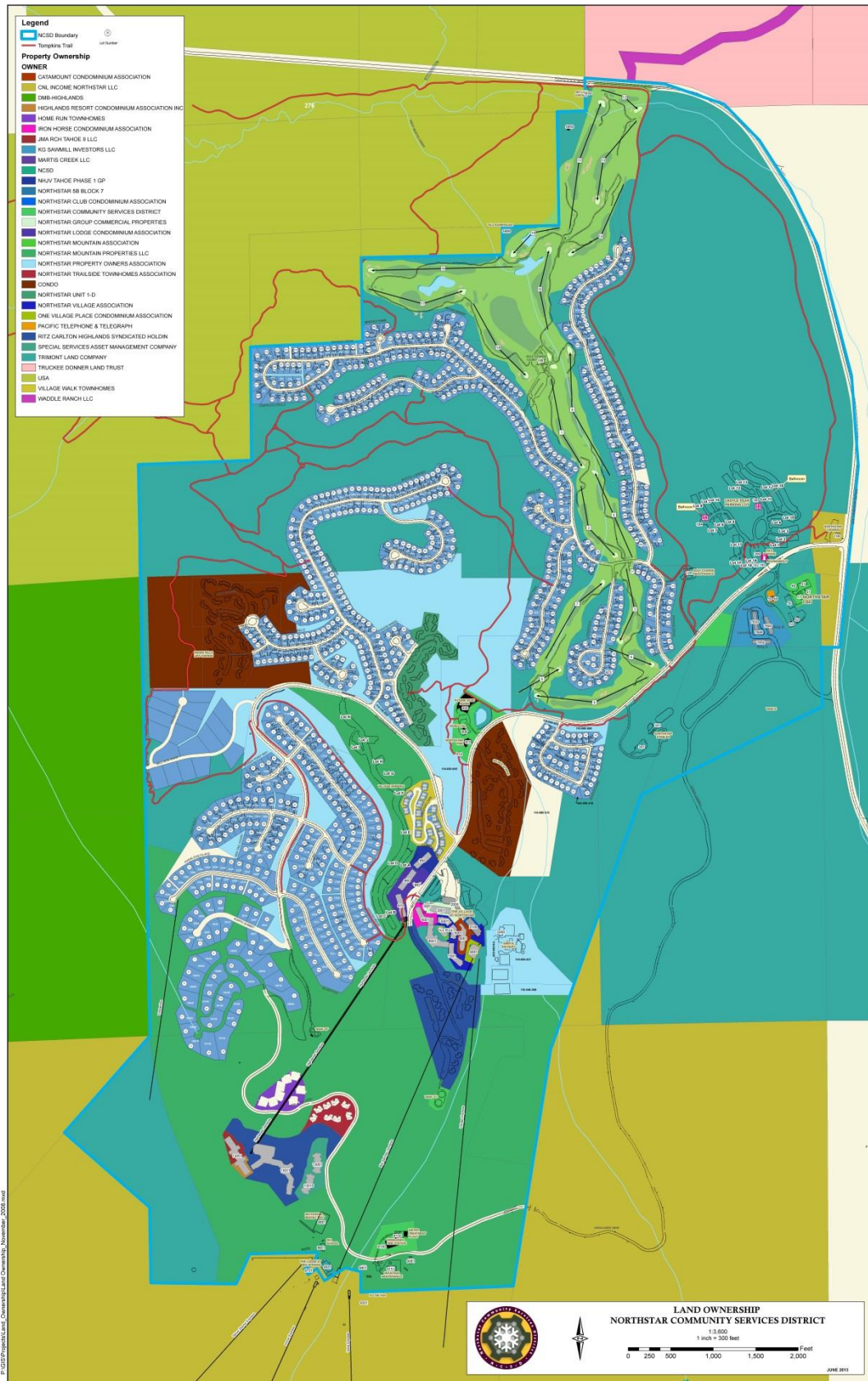


EXHIBIT 2 – FIRE SIMULATION RUNS

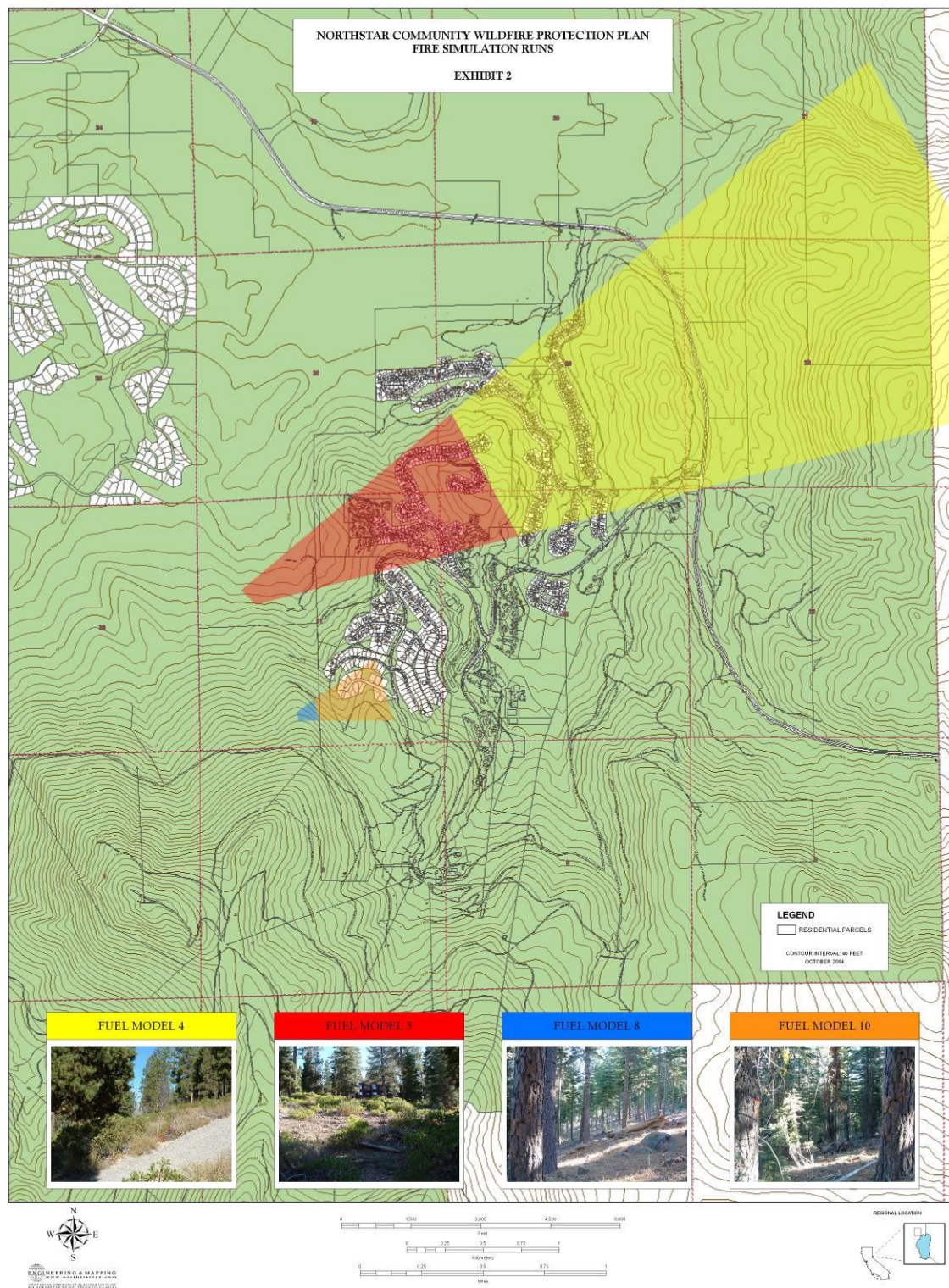


EXHIBIT 3 – DEFENSE & THREAT ZONES

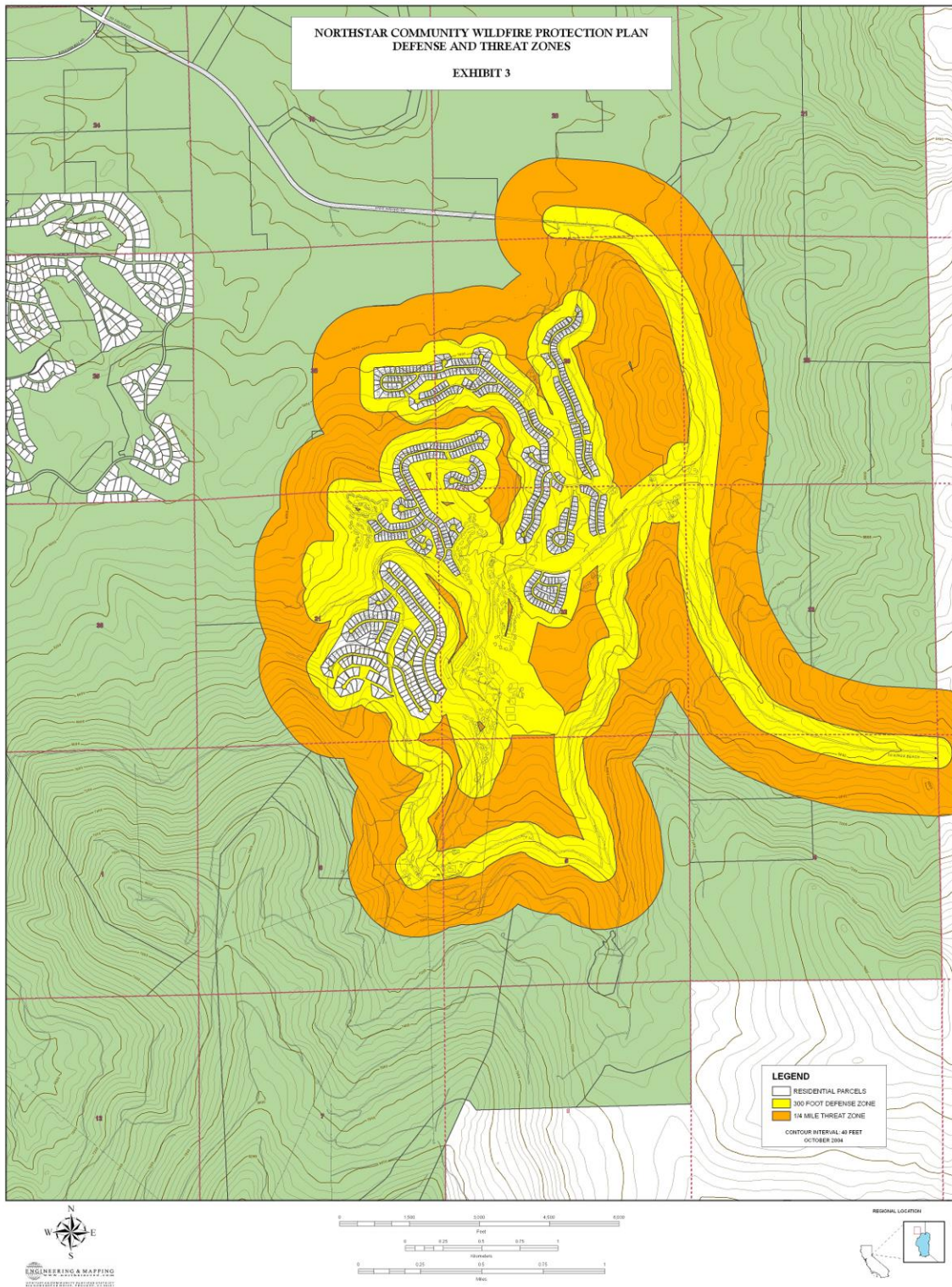


EXHIBIT 4 – DEFENSE & THREAT ZONES – DETAIL

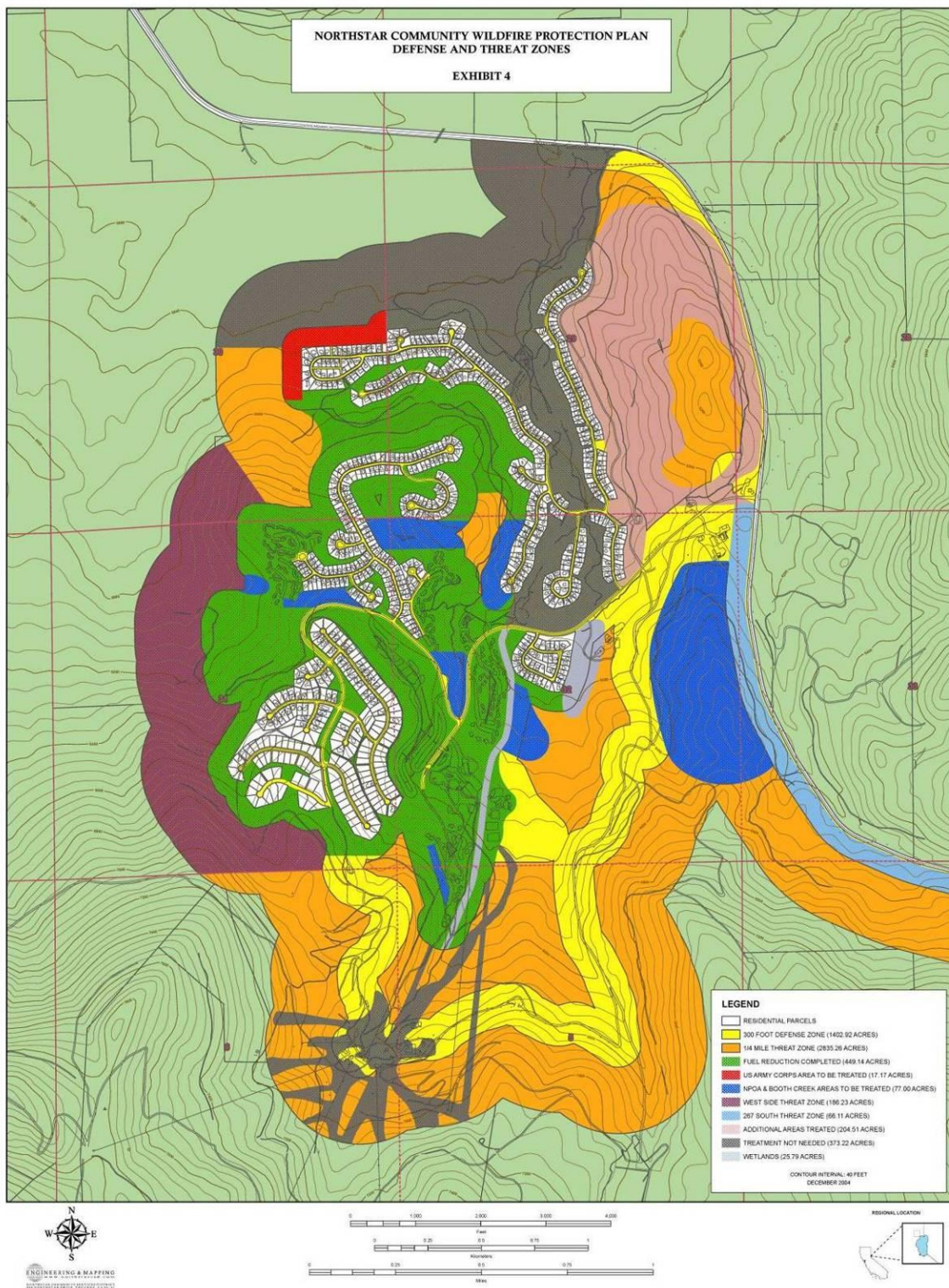


EXHIBIT 5 – NORTHSTAR OF CALIFORNIA, (VAIL RESORTS) LAND OWNERSHIP

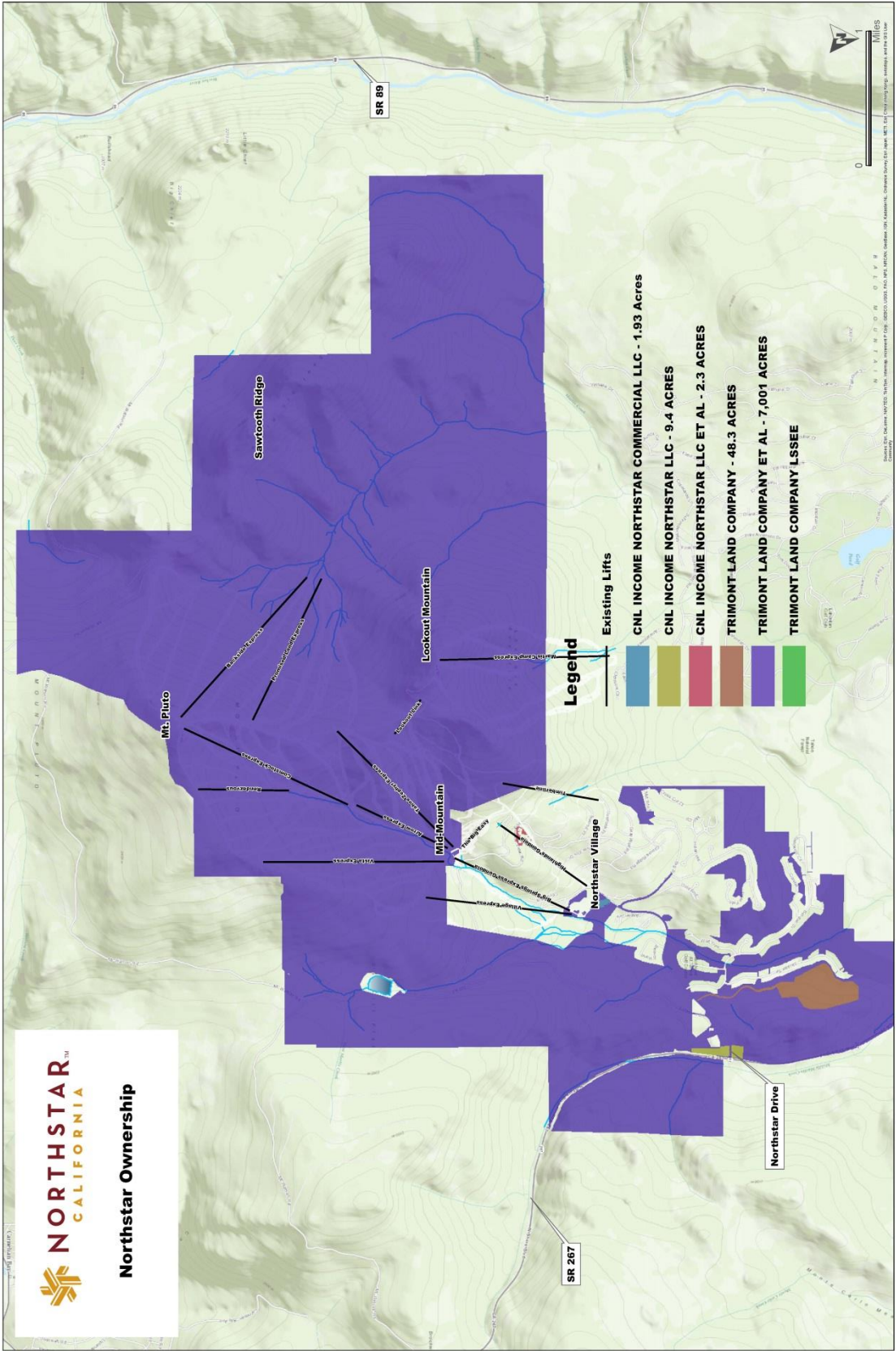
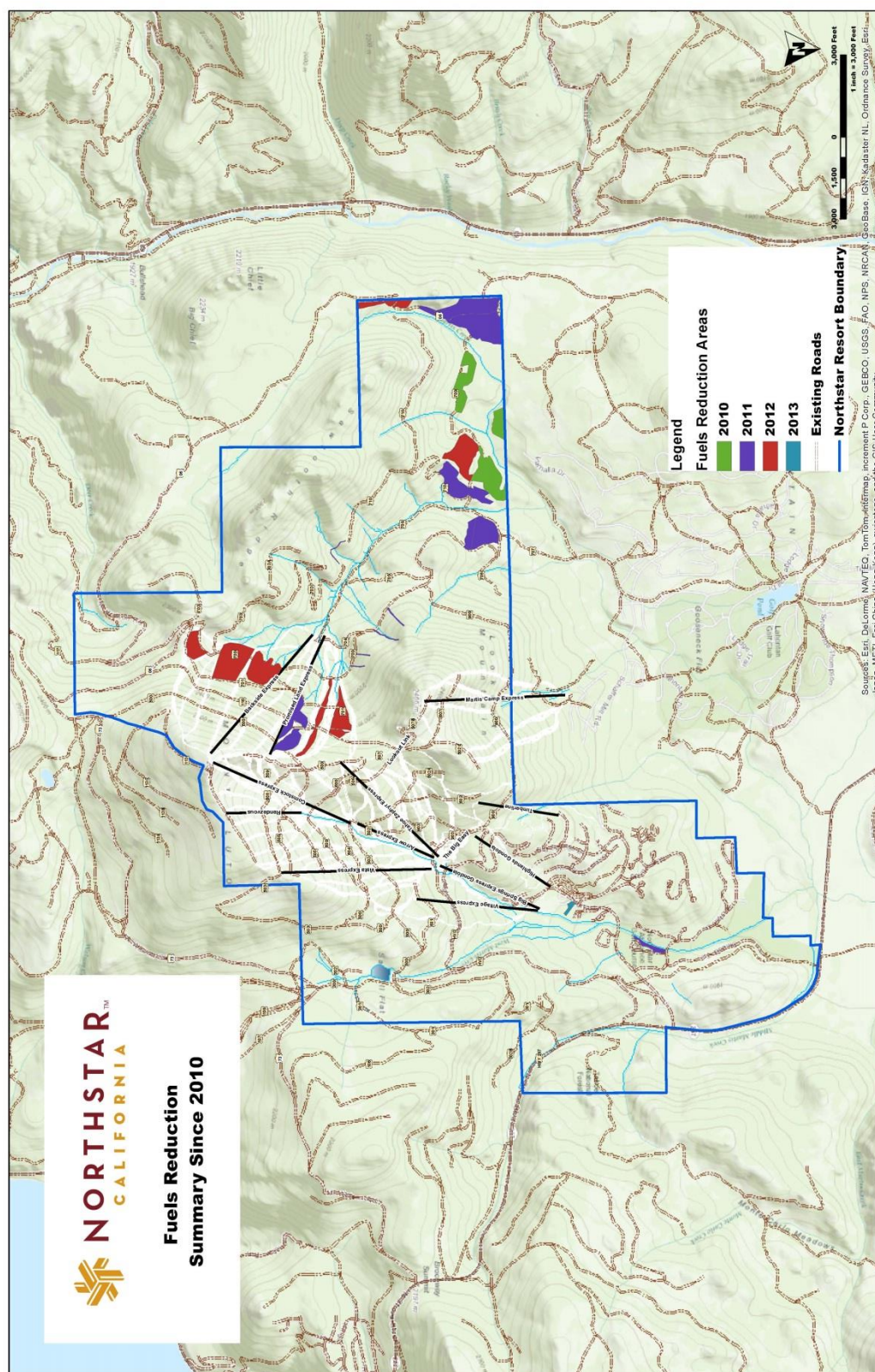


EXHIBIT 6 – 2010-2013 NORTHSTAR AT TAHOE FUELS REDUCTION PROJECT MAP



APPENDIX A - GLOSSARY

ASPECT

The direction a slope faces.

BASAL AREA

Area of the cross section of a tree stem, generally at breast height (1.3 meters or 4.5 feet) and inclusive of bark.

BRUSH

A growth of shrubs, usually of the type undesirable to livestock or timber management. A collective term that refers to strands of vegetation dominated by shrubby, woody plants, or low- growing trees.

CONIFER

Cone-bearing trees, shrubs and mostly evergreens such as pine, spruce and true firs.

DEFENSIBLE SPACE

That area which lies between a structure and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and which provides a space for firefighters to safely defend a structure.

EXTREME FIRE BEHAVIOR

Extreme implies a level of wildfire behavior characteristics that ordinarily precludes methods of direct-fire-control action. One or more of the following is usually involved: high rates of spread, prolific crowning and/or spotting, presence of fire whorls and a strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically and at times dangerously.

FIRE BEHAVIOR

The manner in which a fire reacts to the variables of fuel, weather and topography.

FIREBRAND

Any burning material such as leaves, wood, glowing charcoal, or sparks that could start a fire.

FIRE ENVIRONMENT

The surrounding conditions, influences and modifying forces of fuel, weather and topography that determine fire behavior.

FIRE WEATHER

Weather conditions which influence fire starts, fire behavior and fire suppression.

FUEL

Any combustible material. With regard to wildfire, fuel typically refers to living and dead vegetation.

FUEL BREAK

A wide strip of land strategically located to fight anticipated fires, where hazardous fuels have been replaced with less and/or less burnable fuels. They divide fire prone areas into smaller parcels for easier fire control and provide access for firefighting. They can provide an additional buffer zone between defensible space and escape routes.

FUEL LOADING

The evaluation of specific fuel components and their value expressed in tons per acre.

FUEL TYPE

An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that would cause a predictable rate of spread or difficulty of control under specified weather conditions.

HORIZONTAL CONTINUITY

The degree at which fuels form a continuous layer on a particular horizontal plane.

LADDER FUEL

Fuels which provide vertical continuity between strata. Fire is able to move from surface fuels into tree crowns with relative ease when ladder fuels are present.

LITTER

A surface layer of loose organic debris in forests, consisting of freshly fallen or slightly decomposed organic materials such as leaves, needles, or twigs.

RECEPTIVE FUEL BED

An arrangement of combustible material that is likely to produce a detectable fire when ignited.

SLASH

Debris such as branches leaves and bark from tree cutting or other vegetation-management practices.

SPOTTING

Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the main fire.

TREE CANOPY/ TREE CROWN

The upper part of a tree or other woody plant, carrying the main branch stem and foliage.

WILDFIRE

Any fire occurring in a wildland setting.

WILDLAND/ URBAN INTERFACE (WUI)

Where native vegetation fuel types interface with man-made fuel types, that is, human encroachment into wildland areas.

APPENDIX B – NORTHSTAR CSD ORDINANCE 26-09



N.C.S.D.

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Board of Directors

DUANE EVANS
JEANN GREEN
NANCY IVES
MIKE MOLL
FRANK SEELIG

General Manager

MICHAEL STAUDENMAYER

**BOARD OF DIRECTORS
NORTHSTAR COMMUNITY SERVICES DISTRICT**

ORDINANCE 26-09

**ORDINANCE AMENDING ORDINANCE 4-00, AN ORDINANCE REGARDING WILD
LAND FIRE PREVENTION AND DEFENSIBLE SPACE REQUIREMENTS**

**ADOPTED OCTOBER 21, 2009
EFFECTIVE NOVEMBER 20, 2009**

WHEREAS, the Northstar Community Services District ("District") is a community services district organized and operating under the authority of Government Code Section 61000 *et seq.*; and

WHEREAS, pursuant to Government Code Section 61100(d), the District may exercise any of the powers of a fire protection district pursuant Health and Safety Code Section 13800 *et seq.*; and

WHEREAS, pursuant to Health and Safety Code Section 13869 a district may adopt a fire prevention code; and

WHEREAS, pursuant to Health and Safety Code Section 13871, any citation issued by a district for violation of a fire prevention code or a district ordinance may be processed pursuant to subdivision (d) of Section 17 of the Penal Code; every person who fails or refuses to correct or eliminate a fire or life hazard after written order of a district board or its authorized representative is guilty of a misdemeanor; and every misdemeanor is punishable pursuant to Section 19 of the Penal Code; and

WHEREAS, the lands within the District are state responsibility area lands; and

WHEREAS, pursuant to Public Resources Code Section 4291 and California Code of Regulations, 14 CCR 1299, while the state shall adopt regulations implementing minimum fire safety standards related to defensible space that are applicable to state responsibility area lands, which regulations apply to the perimeters and access to all residential, commercial, and industrial building construction within state responsibility areas, and shall include fuel breaks and greenbelts, these state regulations do not supersede local regulations which equal or exceed minimum regulations adopted by the state; and

WHEREAS, the Board of Directors of the District does hereby specifically and expressly find that the regulations contained herein are reasonably necessary because of local climatic, geological, topographical

and population conditions unique to the Northstar community in order to protect resources, life and property within the area, and are also required to reduce the possibility of a fire originating within the District from spreading to the adjacent Lake Tahoe Basin, an area of national importance and significance.

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE NORTHSTAR COMMUNITY SERVICES DISTRICT ORDAINS AS FOLLOWS:

Section 1. Background.

Fires pose a serious threat to the preservation of the public peace, health and safety, and are extremely costly. Since fires ignore civil boundaries, it is necessary that cities, counties, special districts, state agencies, and federal agencies work together to minimize the threat of fires and maximize the ability to extinguish them quickly. Preventive measures are therefore needed to insure the preservation of the public peace, health, and safety.

The Board of Directors seeks to adopt regulations equaling or exceeding minimum regulations adopted by the State of California ("the State"). The District hereby specifically and expressly finds that regulations contained herein are reasonably necessary because of local climatic, geological and topographical conditions unique to the Northstar area and are further required to reduce the possibility of a fire originating within the District from spreading to the adjacent Lake Tahoe Basin, an area of national importance and significance. The local official designated by Section 13146(b) of the California Health and Safety Code shall enforce the requirements of this Ordinance.

Section 2. Purpose of Ordinance.

The purpose of this Ordinance is to:

a. Classify lands within the District in accordance with whether a high fire hazard is present so that District officials and others with similar wildland fire prevention and suppression responsibility are able to identify measures that will retard the rate of spread and reduce the potential intensity of uncontrolled fires that threaten to destroy natural resources, life or property.

b. Require that the measures referred to in Section 2.a above be implemented in order to accomplish the following:

1. Set maintenance standards.

2. Define penalties for violation of this Ordinance.

Section 3. Classifications.

For purposes of this Ordinance, lands within the District are classified as:

- a. Residential and Commercial Parcels; or,
- b. Fuel Reduction Zones.

Section 4. Residential and Commercial Parcels.

Residential and Commercial Parcels shall include all improved and unimproved single family lots, improved commercial properties and all common area parcels maintained or owned by condominium or townhome developments, or homeowners or property-owners associations or similar common-ownership organizations. Owners of Residential and Commercial Parcels shall:

- a. Comply with all requirements set forth in California Public Resources Code Sections 4291 through 4299, *et seq.*, as amended from time to time, and any regulations adopted thereunder.
- b. In addition to complying with Section 4.a, above, comply with the following treatments:
 1. Maintain the following minimum specifications within 100 feet of any structures on the property:
 - (a) Five feet of clearance (the "Buffer") of all combustible ground fuels around the perimeter of any structure.
 - (b) Beyond the Buffer, and up to 100 feet or to the property line, whichever is less, maintain an average pine needle/forest duff depth of one inch, and in no case exceed a maximum depth of two inches.
 - (c) Remove any tree limbs that are within ten feet horizontally or vertically of any structure.

2. Maintain shrubs on the entire property according to the minimum horizontal spacing between edges of shrubs based on the slope of the property as follows:
 - (a) 0-20% slope - Two times the height of the shrub
 - (b) 21-40% slope - Four times the height of the shrub
 - (c) Slopes greater than 40% - Six times the height of the shrub
3. Remove all standing dead or dying trees on the entire property.
4. Remove all of the lower tree limbs to a minimum of eight feet high (for shorter trees remove limbs on the bottom third of the tree). This distance shall be measured from the lowest hanging portion of the drip line to the ground.
5. All trees the District or the State classifies as intermediate or co-dominant must have the following spacing distances from the edge of one tree canopy to the next:
 - (a) 0-20% slope - Ten feet of canopy spacing
 - (b) 21-40% slope - Twenty feet of canopy spacing
 - (c) Greater than 40% - Thirty feet of canopy spacing

Section 5. Fuel Reduction Zones.

Fuel Reduction Zones include all land that is not included in the definition of Residential or Commercial Parcels in Section 4, and that is within 300 feet of Residential or Commercial Parcels.

Owners of Fuel Reduction Zones shall comply with the following:

a. Stocking: The forest stand must be thinned in accordance with the species components discussed in this Section 5.a.

1. Pure pine stands shall be thinned to a range of 50-75 square feet of basal area;
2. Mixed conifer stands shall be thinned to an average of 75 square feet of basal area; and,

3. True fir forest stands shall be thinned to a range of 75-90 square feet of basal area.

b. Understory: Smaller diameter trees shall be thinned so as to be below the level that provides a fire ladder into larger diameter trees.

c. Brush component: Brush components consisting of native flammable vegetation shall be removed according to the site's land capability and fire characteristics. Brush removal shall consist of a range of actions, from complete removal, to creation of mosaics, depending on the site characteristics, slope, aspect, brush flammability characteristics and proximity to structures, roads and trails.

d. Logging slash: Logging slash over the entire parcel shall be chipped, or pile burned, hauled away or mechanically treated where appropriate and authorized to reduce fuel load on the parcel.

Section 6. New Development.

The District will require, as a condition of approval of new development that the entire parcel be brought into compliance with the applicable standards set forth in Section 4 and/or Section 5 above, as determined by the District.

Section 7. Approval of Landscape Plans.

Owners of all Residential or Commercial parcels shall submit any landscape plan that must be approved by a homeowners or property-owners association or similar common-ownership organization, or that is otherwise subject to advance review under the provisions of deed covenants, conditions and restrictions ("Plan") to the District for approval before implementation of the plan. The Plan shall describe the landscaping in sufficient detail so that the District can evaluate the Plan for compliance with this Ordinance, and the District's review of the Plan will be limited to such compliance. The District's approval of the Plan shall be valid for 24 months from the date of approval.

Section 8. Disclosure Required Prior to Close of Escrow.

Prior to the sale and close of escrow ("Close of Escrow") of any real property subject to the requirements of this Ordinance, the selling property owner shall deliver to the buyer the District's "Defensible Space Requirements" pamphlet ("Pamphlet"). As a condition precedent to Close of Escrow for all real property subject to this Ordinance, the seller shall deliver a copy of the District's Notice of Defensible Space

Requirements form signed by the seller and buyer to the District. Delivery of the Notice to the District shall be timely so long as the Notice is postmarked on or before the date the deed transferring title to the property is recorded in the office of the Placer County Recorder. The delivery of the Pamphlet shall be deemed to represent full and complete compliance with the provisions of this disclosure requirement.

Section 9. Consultation and Advice from District Staff.

Property owners are urged to consult with or request advice from the District regarding the classification of the owner's property, the methods for complying with this Ordinance, or other information about it. The ultimate responsibility for compliance with this Ordinance rests with the property owner.

Section 10. Final Authority.

The District shall have the final authority on the determination of compliance with the provisions of this Ordinance.

Section 11. Additional Permits Required.

Any and all open pile burning of pine needles, slash, brush or other debris shall require a valid permit from the District and any other agencies with jurisdiction.

Section 12. Exclusions From Ordinance.

This Ordinance shall not apply to any land within the District boundaries that is habitat for endangered or threatened wildlife species, or that has historical or archeological significance or is otherwise declared excluded by state or federal law.

Section 13. Violations of Ordinance.

Violations of this Ordinance shall be punishable as provided in California Health and Safety Code Section 13871.

Section 14. Partial Invalidity.

The finding by a court of competent jurisdiction of the invalidity of any part of this Ordinance shall not invalidate any other part.

Section 15. Effective Date of Ordinance; Amendment of Previous Ordinance.

This Ordinance shall take effect and be in force 30 days from the date of its adoption. On its effective date, this Ordinance will supersede, in its entirety, the District's Ordinance 4-00.


PASSED AND ADOPTED at a regular meeting of the Board of Directors of the Northstar Community Services District on October 21, 2009 by the following roll call vote:

AYES: Evans, Green, Ives, Moll, Seelig

NOES: None

ABSENT: None

ABSTAIN: None


Duane E. Evans, President of the Board

ATTEST:


Myra S. Tanner, Secretary of the Board

APPENDIX C – NORTHSTAR CSD ORDINANCE, 28-13, CALIFORNIA FIRE CODE



N.C.S.D

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Board of Directors

JEANN GREEN
NANCY P. IVES, PRESIDENT
FRANK SEELIG
DARRELL SMITH
CATHY STEWART

General Manager

MICHAEL STAUDENMAYER

Northstar Community Services District
Placer County, California

Ordinance 28-13

An ordinance adopting the 2013 California Fire Code and an emergency response impact for fire suppression and emergency services; prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials or explosion; providing for the issuance of permits for hazardous uses or operations; maintaining the Bureau of Fire Prevention, providing officers therefore and defining their powers and duties; and adopting amendments to the 2013 California Fire Code as stated herein.

Be it ordained by the Board of Directors of the Northstar Community Services District as follows:

SECTION 1. ADOPTION OF CALIFORNIA FIRE CODE

1.1 The complete 2013 California Fire Code ("California Fire Code") and Placer County Code Chapter 15, Article 15.12 Liquefied Petroleum Gas Installations, is hereby adopted by the Board of Directors of the Northstar Community Services District ("District") for the purpose of prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials or explosion, including all Appendices, published by the International Code Council, except such portions as are hereinafter deleted, modified or amended by this Ordinance 28-13("Ordinance"). One (1) copy of the California Fire Code has been and is now filed at the headquarters of the District and the same are hereby incorporated as fully as if set out at length herein, and from the date on which this Ordinance shall take effect, the provisions thereof, except as deleted, modified or amended by this Ordinance, shall be controlling within the jurisdiction of the District.

SECTION 2. FINDING OF FACTS, TOPOGRAPHY, AND CLIMATIC AND GEOLOGICAL FACTORS

2.1 Topographical Factors. The District is located high in the Sierra Nevada Mountain Range at the east end of Placer County, nestled on an east facing slope. The community of Northstar is a classic Urban/Wildland Interface Area, which adds the responsibility and demands of both structural firefighting and wildland firefighting. If several fires occur at

the same time, the limited resources of the District would be severely taxed. County roads are, at times, closed due to snow clearing operations in the winter and road repairs in the spring and summer. Northstar is a popular tourist destination in both winter and summer, which causes traffic congestion and can impede the ability of fire equipment to quickly travel to the source of a fire or medical emergency in a timely manner.

2.2 Climatic Factors. The east end of Placer County, specifically the community of Northstar and its surrounding neighbors, can experience in excess of 100 inches of snow in the winter with annual storms that bring rain, ice, snow and fog. The summers are typically hot and dry with regular thunderstorms that bring lightning and little rainfall. The likelihood and ease of combustion increases as the temperature increases and the humidity decreases. Wet winters encourage undergrowth of vegetation that dries out in the summer and creates hazardous fuel conditions.

2.3 Geological Factors. The Sierra Nevada Mountain Range was created by two primary factors: (1) plate tectonics, which are a collision of the North American Plate and the Pacific Plate; and (2) volcanic action, as shown by the numerous natural hot springs scattered throughout the Sierra Nevada Mountain Range. These two factors cause frequent small earthquakes and the occasional large temblor. While there is no prediction of a major or minor earthquake for this region, there is always a possibility, which must be recognized.

SECTION 3. AMENDMENTS TO THE CODE

3.1 The California Fire Code Section **104.7.2** is amended to read: **Technical Assistance.** To determine the acceptability of building design, Fire Department access, high technology processes, products, procedures, facility hazardous materials control, fire and life safety, material acceptability and uses relating to the design, operation, occupancy of a building or premises subject to the review and inspection by the District, the Chief of the Northstar Fire Department ("Fire Chief") is authorized to require the owner or the person in possession or control of the building or premises to provide payment to the District for services related to such review and inspection. Payment will cover any and all costs to the District for the retention of a fire and life safety consulting or engineering firm for the purposes of plan review, inspections and/or preparation or review of technical reports. Such payment will be used to cover actual costs incurred by the District for such services. The owner or person in possession or control of the building or premises shall pay amounts for services prior to occupancy. The Fire Chief is authorized to collect payment, in advance of services, as a monetary deposit. Any amount of deposit that exceeds service cost shall be refunded.

Such services shall be carried out by a qualified firm or organization with experience and expertise in fire protection engineering, hazard specific specialists, laboratories or fire safety consulting firms or organizations acceptable to the Fire Chief. All work shall be carried out under the direction of the Fire Chief and shall analyze the fire safety

properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes to the Fire Chief.

The Fire Chief is authorized to require design submittals prepared by the property owner or the owner's representative to bear the stamp and signature of a California registered professional engineer or licensed California state contractor in the fields of fire alarm design and installation and/or fire sprinkler design and installation.

3.2 Section 308.1.9 of the California Fire Code is added to read: Outdoor Open Flame Decorative Appliances. Fire Pits: Shall be installed with the following:

- A. Gas shut-off valve located at stub out.
- B. Timer device to regulate maximum operating time to (3) three hours.
- C. (10) Ten feet vertical & horizontal clearance to all combustibles measured from center of the flame ring.
- D. Gas shut-off valve accessible at fire pit.
- E. (2) Two feet maximum flame height.
- F. All parts/assemblies to be U.L. or ASME listed.
- G. Submit site plan showing location and design.
- H. Provide cut sheets for fire pit design.
- I. Surface supporting fire pit system shall be non-combustible.

3.3 The California Fire Code Section 503.6 is amended to read: Security Gates. The installation of security gates across a fire apparatus access road shall be approved by the Fire Chief. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with U.L. 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

Security gates shall meet the following additional standards:

- A.) Radio signal 'click to enter' system using the "V-Fire 23' Tac. Channel Frequency. The frequency range may be up to 50' feet maximum.
- B.) Closure delay range between 30 and 45 seconds.
- C.) Reflectors on both sides of swing arms.
- D.) Knox Box (#3261 series).
- E.) Knox Pad Lock #3770 Exterior Model) on meter box/electrical breaker box access.
- F.) Knox Key switch (#3502 Model) access for both Northstar Fire Department and Truckee Fire Protection District.

G.) Gate mechanical boxes to be protected from vehicle impact (Bollards or similar protection).

H.) Snow and ice protection shall be installed for all mechanical boxes and swing arm operations, to include heat tape, heated mats, and rubber gaskets.

I.) Maintenance contract with licensed contractor.

3.4 The California Fire Code Section **505.1** is amended to read: **Address Identification.** New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 6 inches high (152.4 mm) with a minimum stroke width of 0.5 inch (12.7 mm). Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained.

3.5 The California Fire Code Section **506.1** addressing **Key Boxes** is amended to read: **Where Required.** Key boxes, key locks and electric key switches shall be mounted and installed on all gates, fences, main entry doors or lobbies in an area approved by the Fire Chief. The Fire Chief shall determine the number and location of key boxes for each structure. The key box shall be of an approved type (Knox Box) and shall contain keys to gain necessary access as required by the Fire Chief. Key boxes are required in the following locations:

- a. All new construction, residential and/or commercial structures.
- b. Residential renovation projects that add more than 500 square feet of new enclosed habitable construction.
- c. Existing commercial structures.

3.6 The California Fire Code Section 603.9 is amended to read: **Gas Meters.** Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with section 312 or otherwise protected in an approved manner.

1.) The meter assembly shall be installed on the gable end of the building or under an engineered deck, as close as practical to the building wall.

2.) A protective cover, designed to be equal or greater than the Building Design Load (determined by the building department), approved by the supplier, shall be installed over the meter assembly, securely supported to the ground or diagonally to the building wall. When supported to the ground, the footing for the supports shall be founded a minimum of six inches (6") below finished grade.

3.) Door covers prohibited.

- 3.7 The California Fire Code Section **901.6.3** is added to read: **Owner's Responsibility.** It is the property owner's responsibility to ensure all fire suppression systems, fire alarm systems, equipment and devices are maintained fully functioning and operational at all times. If requested by the District, the property owner shall provide certification that an appropriate licensed contractor has inspected and tested the fire protection systems, including the operation of any provided backflow preventer. The owner shall provide requested information within 30 days.
- 3.8 The California Fire Code Section **901.7.7** is added to read: **False Alarms.** Any owner of a fire protection/alarm system which produces a false alarm shall be liable for any and all charges for Fire Department response services at the formula rate prescribed in Ordinance 99-1 "An Ordinance Adopting a Fee Schedule for All Fire Suppression and Emergency Services."
- 3.9 The California Fire Code Sections **903.2.1** through **903.2.18** are deleted and section **903.2, regarding automatic sprinkler systems,** is amended to read: **Where required.** Approved automatic sprinkler systems shall be installed throughout all occupancies. This requirement applies to all occupancies regardless of square footage. Application of this requirement becomes effective where a building permit is applied for through the County Building Department for new construction after the effective date of this Ordinance. All fire sprinkler system plans shall be submitted to the Northstar Community Services District, Fire Department.

For the application of National Fire Protection Association ("NFPA") 13D, in one- and two-family dwellings, underground supply pipe shall be hydrostatically tested at 150 psi for two hours, and the system shall be flushed. Above ground piping shall be hydrostatically tested at 150 psi. for two hours.

For the application of National Fire Protection Association ("NFPA") 13D, in one- and two-family dwellings, hydraulic design and informational sign shall be attached to the riser system as listed in NFPA 13.

For the application of National Fire Protection Association ("NFPA") 13D, in one- and two-family dwellings, all risers shall be designed and constructed per the District's Residential Riser Detail.

For the application of National Fire Protection Association ("NFPA") 13D, in one- and two-family dwellings, **garages shall be provided with automatic sprinkler protection utilizing quick response or residential type sprinklers.**

Exceptions:

- (1) Existing R-3 residential structures **without** sprinklers are not required to sprinkler protect additions.
- (2) Existing R-3 residential structures **with** sprinklers shall be required to sprinkler protect all additions and garages.

(3) Low life safety hazard structures, such as stand-alone public restrooms and ski lift operator structures that are less than **500** square feet shall be evaluated by the Fire Chief on a case-by-case basis.

3.10 The California Fire Code Section **903.4** regarding **Sprinkler System Supervision and Alarms, Exception 1** is amended to read:

1. Automatic sprinkler systems protecting one- and two-family dwellings shall have all valves, including the flow switch, monitored by a local audible alarm to ensure that all valves remain in the open position.

[Remainder of Section 903.4, including exceptions remain unchanged and adopted.]

3.11 The California Fire Code Section **903.4.2** regarding **Alarms** is amended to add:
An exterior bell shall be of 10-inch minimum size and/or the electronic audible notification device shall be measured at a minimum of 110 db., read at the street.

3.12 The California Fire Code **Appendix B, Section B105.2** is amended to read:
B105.2 Buildings Other than One- and Two-Family Dwellings. The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.1.

Exception:

A reduction in fire-flow of 50 percent is allowed when the building is provided with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5,678 L/min) for the prescribed duration as specified in Table B105.1.

3.13 The California Fire Code, Appendix C, **Table C105.1** is amended to read: **Number and Distribution of Fire Hydrants.**

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS^a	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT
1,750 or less	1	300	250
2,000-2,250	2	300	225
2,500-3,000	3	300	225
3,500-4,000	4	300	210

SECTION 4. EMERGENCY RESPONSE IMPACT

4.1 INFRASTRUCTURE REQUIREMENTS

4.1.1 The District shall evaluate its ability to provide safety services in accordance with Sections 4.1.2, 4.1.3, and 4.1.4, below. Should the District determine that additions to or modifications of facilities and/or equipment are required, the developer shall provide to the District said additions or modifications. Facilities and/or equipment shall be installed and made serviceable prior to start of construction.

4.1.2 Infrastructure demand on emergency services and the associated required response equipment and housing facilities will take into account the following: a) response time; b) response method; and c) equipment required.

4.1.3 Infrastructure demand will be determined by one or more of the following District guidelines and NFPA standards/guides to determine the number and types of equipment and facilities necessary to provide a reasonable degree of emergency fire and medical protection response as determined by the Fire Chief.

- a) Maintaining the District's 4-minute emergency response time goal.
- b) NFPA 1201, Standard for Providing Fire and Emergency Services to the Public, 2010 Edition.
- c) NFPA 1141, Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas, 2012 Edition.
- d) NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2013 Edition.
- e) NFPA 1404, Standard for Fire Service Respiratory Protection Training, 2013 Edition.
- f) NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, 2010 Edition.
- g) NFPA 921, Guide for Fire and Explosion Investigations, 2011 Edition.
- h) NFPA 1600, Standard on Disaster/Emergency Management and Business Continuity Programs, 2013 Edition.
- i) NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations, 2013 Edition.
- j) NFPA 1221, Standard for the Installation, Maintenance and Use of Emergency Services Communication Systems, 2013 Edition.

- k) NFPA 1402, Guide to Building Fire Service Training Centers, 2012 Edition.
- l) NFPA 1901, Standard for Automotive Fire Apparatus, 2009 Edition.
- m) NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2010 Edition.
- n) Insurance Services Office (ISO) Fire Suppression Rating Schedule.
- o) Master Community Fire Protection Plan Recommendations.

4.1.4 When evaluating response times, necessary equipment and station locations, the Fire Chief may confer with additional experts/consultants as to fire service practices. The consultant's fee may be assessed to owner, developer or contractor at no cost to the District.

4.2 REQUIREMENTS FOR FACILITIES AND/OR EQUIPMENT

- 4.2.1 Facts and evidence obtained from sources outlined in Section 4.1 above will form the basis for necessary services and shall be provided in writing to the owner, developer or contractor.
- 4.2.2 If the District determines that additional facilities, equipment, or outside services are required to meet the obligations of the District in accordance with Section 4.1, the owner, developer, or contractor shall provide sufficient funds, in a timely manner, to permit the District to procure the same for use prior to commencement of construction. In the case of a planned multi-phase development, the Fire Chief may require a development agreement identifying the requirements and timing.
- 4.2.3 Commercial occupancies shall be assessed for required facilities and equipment for each building where the square footage exceeds 50,000 square feet.
- 4.2.4 The Fire Chief may authorize occupancies to exceed the thresholds listed above; provided that unbreached fire rated walls meet at least a four-hour fire resistance rating and extend 30 inches beyond all vertical or horizontal building projections.

4.3 OWNERSHIP

- 4.3.1 All equipment, buildings, property purchased by the District based on facilities and/or equipment assessed or outside services rendered, and reports issued shall become the sole property of the District and are non-refundable, regardless of project funding, project start or completion dates, or final occupancy.

SECTION 5. APPEALS

- 5.1 Whenever the Fire Chief disapproves an application or refuses to grant a permit applied for, or if the applicant claims that a decision by the Fire Chief misconstrues, misapplies, or wrongly interprets the provisions of the California Fire Code or this Ordinance, the applicant may appeal the decision of the Fire Chief in writing to the Board of Directors of the District within 30 days from the date of the decision appealed.

SECTION 6. PENALTIES

6.1 Any person who:

- (1) violates any of the provisions of this Ordinance or the California Fire Code as adopted and amended herein,
- (2) fails to comply with this Ordinance or the California Fire Code as adopted and amended herein or who violates or fails to comply with any order made hereunder,
- (3) builds in violation of any detailed statement of specifications or plans submitted and approved hereunder or any certificate or permit issued hereunder and from which no appeal has been taken, or
- (4) fails, within the required time, to comply with such an order as affirmed or modified by the Board of Directors of the District or by a court of competent jurisdiction,

shall severally for each and every such violation and noncompliance, respectively, be guilty of a misdemeanor, punishable by a fine and/or imprisonment as determined by the court having jurisdiction within the County of Placer. The imposition of a penalty for any violation shall not excuse the violation or permit it to continue. All such persons shall be required to correct or remedy such violations or defects within a reasonable time, and, when not otherwise specified, each ten days that prohibited conditions are maintained shall constitute a separate offense.

- 6.2 The application of the above penalty shall not be held to prevent the enforced removal of prohibited conditions.

SECTION 7. REPEAL OF CONFLICTING ORDINANCES

- 7.1 All former ordinances or parts thereof conflicting or inconsistent with the provisions of this Ordinance or of the California Fire Code as adopted and amended herein are hereby repealed.

SECTION 8. VALIDITY

- 8.1 Notwithstanding a declaration that any section, paragraph, sentence or word of this Ordinance or the California Fire Code as adopted and amended herein is for any reason invalid, all other portions of this Ordinance shall remain in full force and effect.

SECTION 9. REPLACEMENT OF PRIOR ORDINANCE

9.1 This Ordinance replaces Ordinance 27-11 in its entirety.

SECTION 10. DATE OF EFFECT

10.1 This Ordinance shall take effect and be in full force and effect upon ratification of the Placer County Board of Supervisors and submission of a copy of this Ordinance to the California Building Standards Commission, or January 1, 2014, whichever is later. The Clerk of the District is directed to post or publish this Ordinance as required by law.

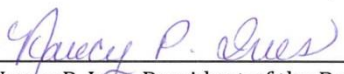
PASSED AND ADOPTED at a duly held meeting of the Board of Directors of the Northstar Community Services District on by the following roll call vote:

AYES: Green, Ives, Seelig Smith (1-vacancy)

NOES: None

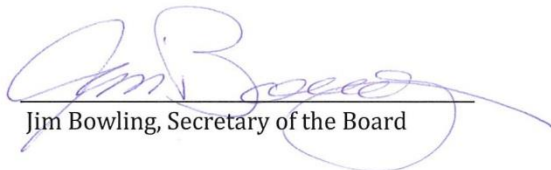
ABSENT: None

ABSTAIN: None



Nancy P. Ives, President of the Board

ATTEST:



Jim Bowling, Secretary of the Board

APPENDIX D – CONE FIRE, 2002

Cone Fire Tests Fuel Reduction Treatment Effectiveness

Blacks Mt Experimental Forest and the Cone Fire, September 26, 2002

By Gary Nakamura, UC Cooperative Extension (Many photos courtesy of USFS PWS Research Station. Ecological Research Project, Redding, CA.)

The September 26, 2002, Cone Fire tested the effectiveness of a variety of fuel-reduction treatments under severe fire behavior conditions of wind (10 mph), low humidity and low fuel moisture. In 1996, an Ecological Research Study was established at Blacks Mt Experimental Forest using timber harvest, biomass harvest and prescribed fire to create different stand structures and fuel conditions. Eastside pine-type forest with 2 to 3 age classes (200 year, 100 year and <100 year, **(Photo 1)** Ponderosa and Jeffrey pine, incense cedar and white fir, was thinned to: 1) Maintain high structural diversity, while reducing ladder fuels **(Photo 2)**; and 2) Create low structural diversity (uniform stand structure) by harvesting all large, overstory trees, snags and thinning the ladder fuels, creating uniformly sized and spaced trees of the 100-year-old age class (Photo 3). Large, 250 to 300-acre, treatment units were thinned to these two structures and prescribed fire was applied to half of each unit, further reducing logging slash, surface fuels and fire hazard.



Photo 1 - Original stand structure, Research Natural Area B.



Photo 2 - Unit 41, High structural diversity, without prescribed fire.



Photo 3 - Unit 46, low structural diversity unit, prescribe burned, October 2000.

The Cone Fire burned from the NW and into Units 46, 43 and 41 (**Photo 4**). The fire was driven by low-speed winds from the NW (10 mph), but the humidity was very low, in the teens and single digits, even at night, causing fire conditions to be considered severe. Fuel moisture was also very low (3 inches) with material at 8% moisture (critical levels are 12% or less).

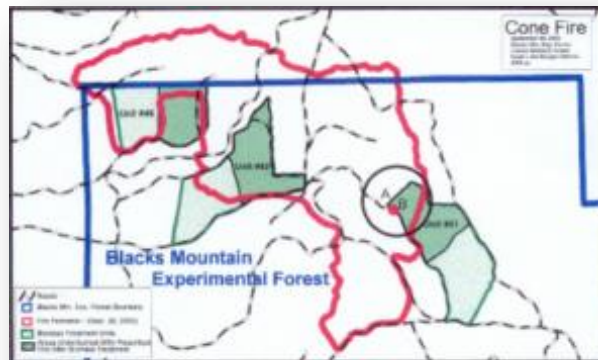


Photo 4 - Map of Cone Fire, September 26, 2002.
Fire boundary in red. Unit 46 in upper left corner;
Unit 43 in center; Unit 41 in center right.

Photo 5 is an oblique aerial photo showing fire behavior in Unit 46, a low-diversity unit. (**Photo 6, next page**) On the left side, thinned without prescribed fire, the Cone Fire burned into the unit and killed trees; on the right side, thinned with prescribed fire, the Cone Fire was unable to burn. (**Photo 7, next page**) Further to the right and above Unit 46, an untreated stand burned severely.



Photo 5 - Cone Fire burned through Unit 46 w/o prescribed burn (circle center left); burned around Unit 46 with prescribed fire (circle center right).

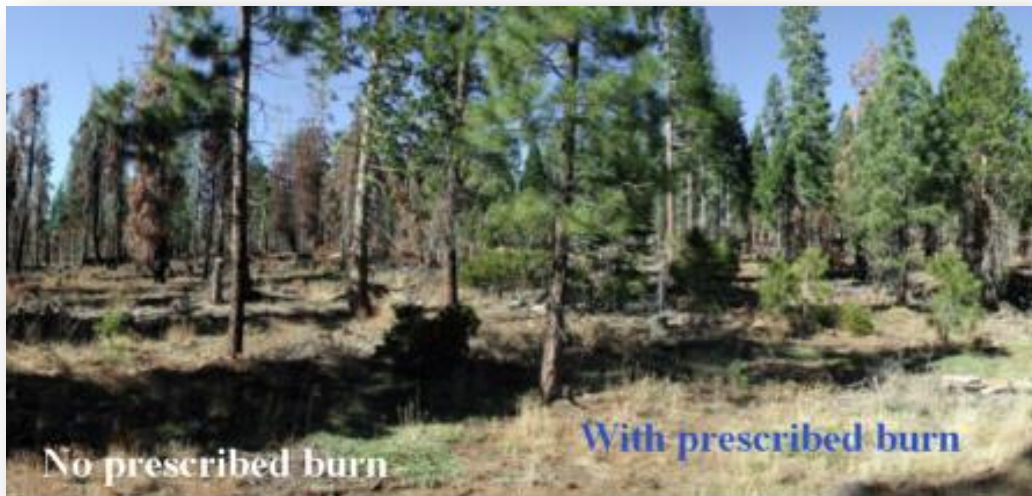


Photo 6 - Unit 46, thinned only, on the left. Thinned and prescribe burned in 2000, on the right. Cone Fire did not enter the area which was prescribe burned, but did severely burn the thinned only unit.



(Photo 8) shows the fire behavior at the interface between untreated forests. (Photo 9) The Cone Fire dropped from the crowns (flame lengths 1.5 times tree height or about 100 feet) to the ground when it entered Unit 41, but the radiant heat from the adjacent crown fire was sufficient to scorch and likely kill trees a few hundred feet into Unit 41. However, the wildfire did extinguish itself in Unit 41 (Photo 10, next page).



Stop No. 3, Cone Fire - Treatment Unit #41

Photos A & B (See Next Page)

Photo 8 - Untreated forest, left side; Unit 41 with prescribed fire on right side. Vertical pink line is fire retardant. See photo 4 to locate this photo.



Photo 9 - Untreated forest shown in Photo 8. Crown fire with 100 flame lengths.



Photo 10 - Unit 41 with prescribed burn. Cone Fire dropped to the ground here.



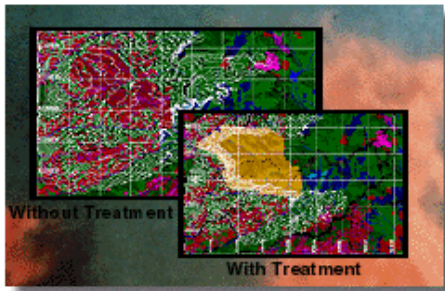
Photo 11 - center of the untreated forest, NW of unit 41.

(Photo 11) is in the center of the untreated forest, showing the most severely burned area. No trees are alive and few have any needles remaining. The forest floor is completely consumed.

Conclusions - The Cone Fire tested the fuel treatments applied at Blacks Mt Experimental Forest under severe fire behavior conditions of wind, low humidity and low-fuel moisture. Units which received both thinning of ladder fuels (biomass harvest) and a follow-up-prescribed fire to further reduce surface fuels had the wildfire drop to the ground where they extinguished or could be safely suppressed, while units which were just thinned of ladder fuels had sufficient surface fuels to severely scorch trees. The untreated forest burned the most severely, with total tree kill, forest floor consumption and canopy consumption.

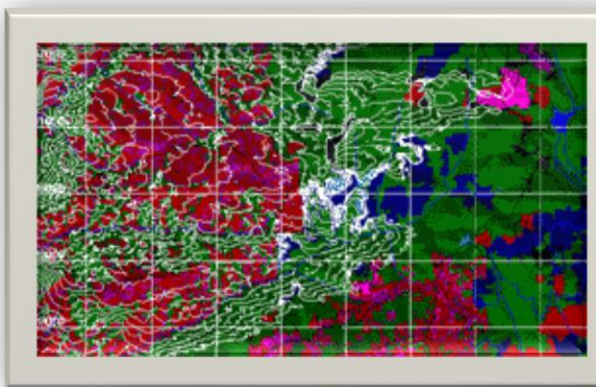
© 2004 - Regents of the University of California Division of Agriculture and Natural Resources

APPENDIX E – OLD GULCH FIRE, 1992

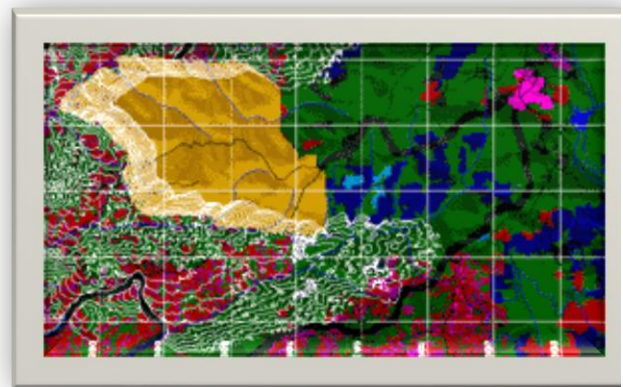


How Pre-fire Management Project Helped in the Old Gulch Fire

FARSITE, a spatial fire spread model, was used to assess the relative effectiveness of pre-fire fuel modification projects on potential outcomes from a 1992 wildfire in Calaveras County, California. This very large and damaging wildfire burned approximately 17,000 acres and cost nearly \$29 million in suppression costs and damages. Recent pre-fire projects involving significant fuel modification altered fire behavior on two fronts and were considered important in reducing final fire size and damage. This analysis uses computer modeling to assess the tradeoffs associated with these treatments. In both instances, the fuel treatment project showed significant effects on reduced fire spread rate, fire line intensity and eventual fire size at the end of the simulation period. These results were interpreted against similar modeled scenarios without the fuel modifications in place. The example shown below compares the growth of the fire over a 24 hour period with and without the Skull Ranch Forest Improvement and Fuel Reduction Project. As is evident, as the fire crosses into the treated area (gold) its advance is significantly reduced. Modeled fire size at the end of the simulations was 4,114 acres with the project and 6,220 acres without the project. More importantly, the project effectively clipped the fire front from its up-canyon advance on the community of Arnold (as shown in pink in the upper right), where property values were assessed at greater than 1.6 billion dollars.



NO TREATMENT



WITH TREATMENT

The “Full Report on exploring FARSITE modeling of pre-fire projects on the Old Gulch Fire” is no longer available as a resource from the State of California.

APPENDIX F – BUILDING CONSTRUCTION RECOMMENDATIONS

Wildland Urban Interface

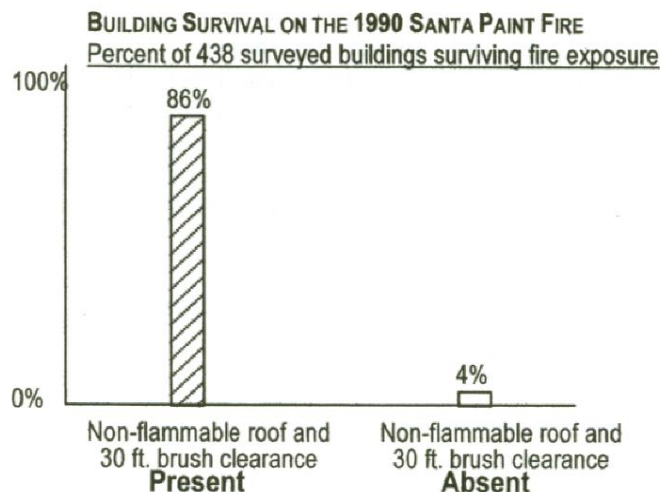
Ignition Resistant Building Construction Recommendations

2004 Community Wildfire Protection Plan Workshops

California Fire Alliance & California Fire Safe Council

One of the major objectives of wildfire control in general, and pre-fire management hazard reduction in particular, is to reduce the loss of life and property. The historical pattern of building loss during Interface fires indicates that vegetation fuel management must go hand-in-glove with ignition resistant building construction to maximize the effectiveness of fire loss mitigation measures.

Building loss and survival on the 1961 Bel Air fire, which destroyed 505 houses, was well documented. The report *“Decision Analysis of Fire Protection Strategy for the Santa Monica Mountains”*¹ found that 71% of the buildings with 26-50 feet of brush clearance survived the fire. However, the survival rate of buildings exposed to the fire increased to 95% for houses that had both brush clearance and ignition resistant building construction (in this case non-wood roof covering). A similar pattern was seen on the 1990 Santa Barbara Paint fire, shown graphically below (Source: *“California’s I-Zone: Urban/Wildland Fire Prevention & Mitigation”* p.120).



On the Paint fire, which destroyed 479 houses and major buildings, the survival rate (above) was 86% for houses with both non-flammable roofing and 30 feet of brush clearance. Only 4% of the 438 houses surveyed in the Paint fire survived where non-flammable roofing and 30 feet of brush clearance were absent. The modeling of structure loss and survival on the Paint fire revealed that brush clearance alone only “explained” or accounted for 11% of the variation seen in the structure survival patterns. When brush clearance was combined with roof type in the model, and the effect of defensive actions was accounted for, the model explained 59% of the variability in structure loss.

This is strong evidence that vegetation management *alone* will not be able to fully explain, nor mitigate, building loss on wildfires. Hence the need for the comprehensive approach in this plan, using a combination of vegetation management and addressing recommendations for ignition resistant building construction. There is also strong evidence that this comprehensive approach will

work to significantly reduce Interfaces losses. The "*Los Angeles Times*" (1 April 2004) reporting on the Southern California conflagrations of October 2003 clearly revealed the need for, and effectiveness of, combining vegetation management and ignition resistant building construction for reducing building loss in wildfires:

"Amid the ashes of the most costly wildfires in California's history lies evidence of a crucial lesson: Fire-resistant construction and vigilant removal of flammable vegetation significantly improved the odds of a home's survival, according to a Times analysis of fire records from more than 2,300 destroyed structures.

The impression left by an out-of-control fire racing through communities can be one of random destruction, with one house, or a whole block, burned to the ground and the next one spared for no apparent reason.

In fact, according to the Times analysis - which covered homes destroyed by the deadliest of the blazes, San Diego County's Cedar fire - houses built since 1990 were far less likely to burn than those constructed in any previous decade. Houses built during the 1990s were damaged or destroyed at less than half the rate of houses built earlier."

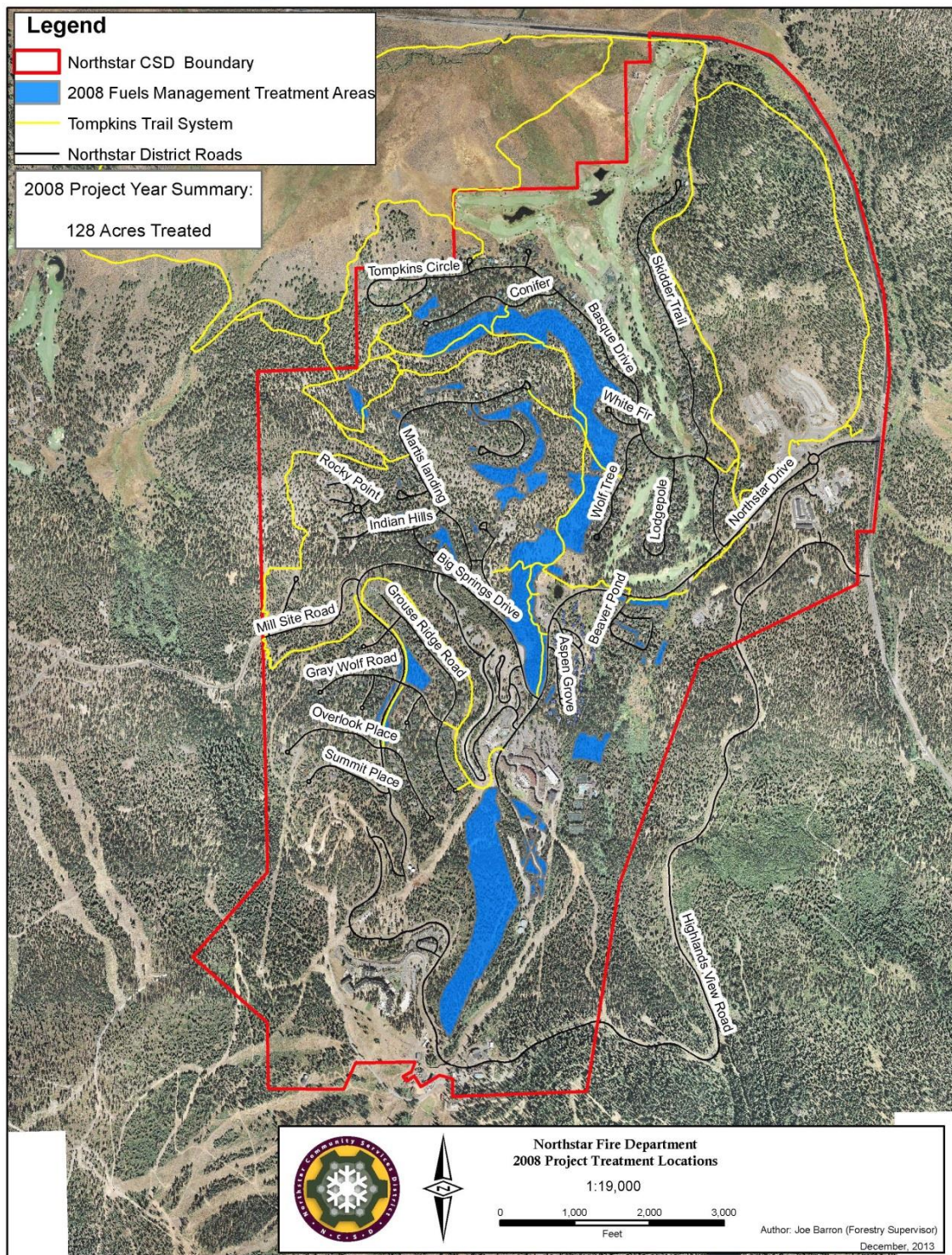
The communities and homeowners covered by this plan have, for the past 40 years, had recommendations that can be (and have been) taken to reduce the ignitability of structures. An outcome of the 1961 Bel Air fire was publication of the "*Fire Safety Guides for California Watersheds*" by the County Supervisors Association of California in 1965. These recommendations have been updated through the years. The current version of these "Fire Safe Guides" is "*Structural Fire Prevention Field Guide for Mitigation of Wildfires*" and can be found at <http://osfm.fire.ca.gov/structural.html>.

These recommendations for ignition resistant building construction include:

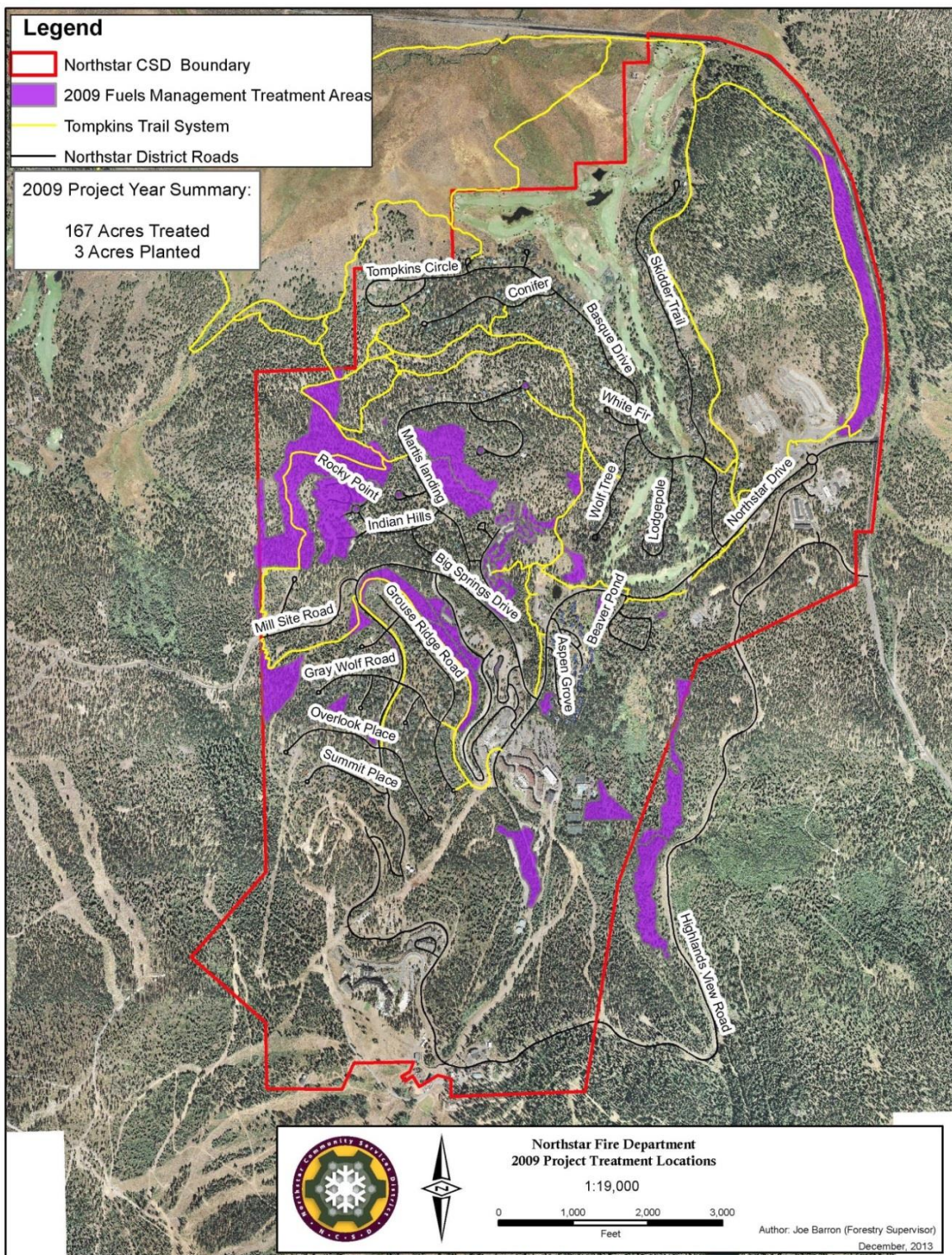
- Roofing
- Eaves & Balconies
- Exterior Walls
- Rafters
- Windows
- Doors
- Attic ventilation openings
- Underfloor Areas

In response to the persistent loss of life and property in wildfires the most important of the recommendations is now a requirement. All new buildings, and significant re-roofing of existing buildings, in the communities covered by this plan are required to have ignition resistant roofing (California Building Code §1503). The State of California is also in the process of promulgating changes to the state building code expanding the interface roof requirements and including new requirements addressing exterior wall construction, vents, and ancillary structures.

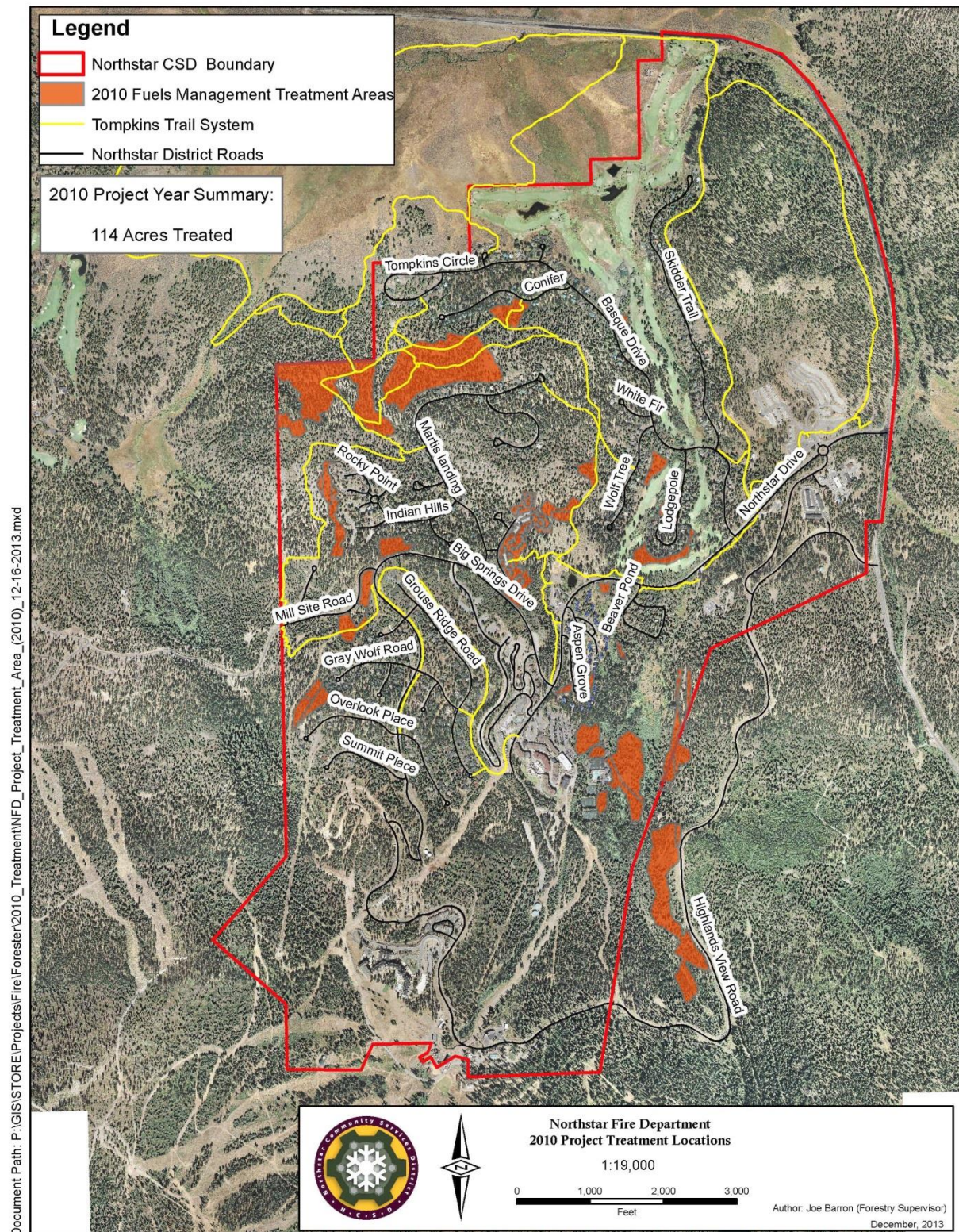
APPENDIX G – FUELS MANAGEMENT TREATMENT AREAS



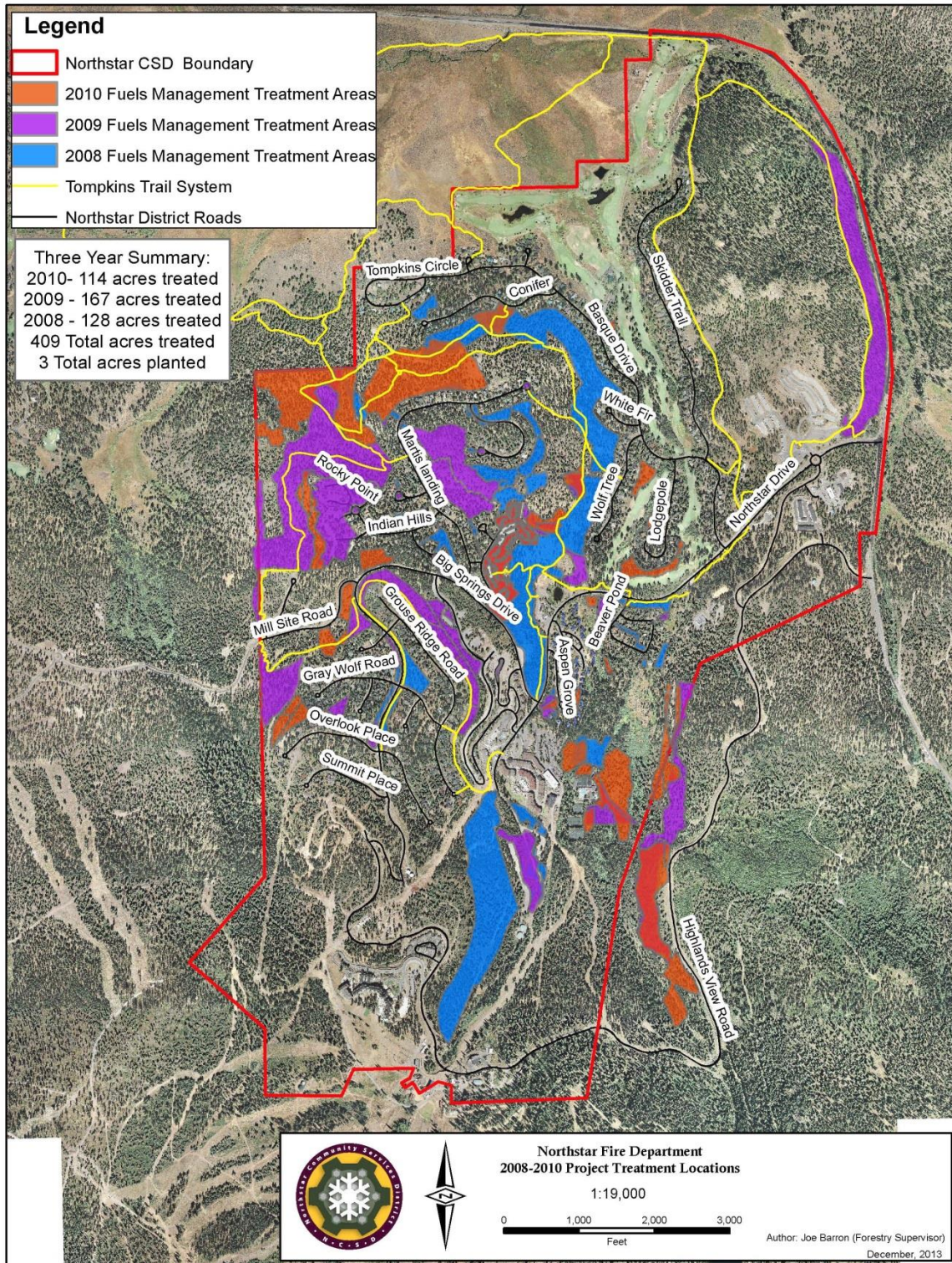
Areas in blue depict 128 acres of fuels reduction forest health treatment that was completed within the NCSD boundary for 2008. The work done was based on federal funding, District compliance and forest enhancement work.



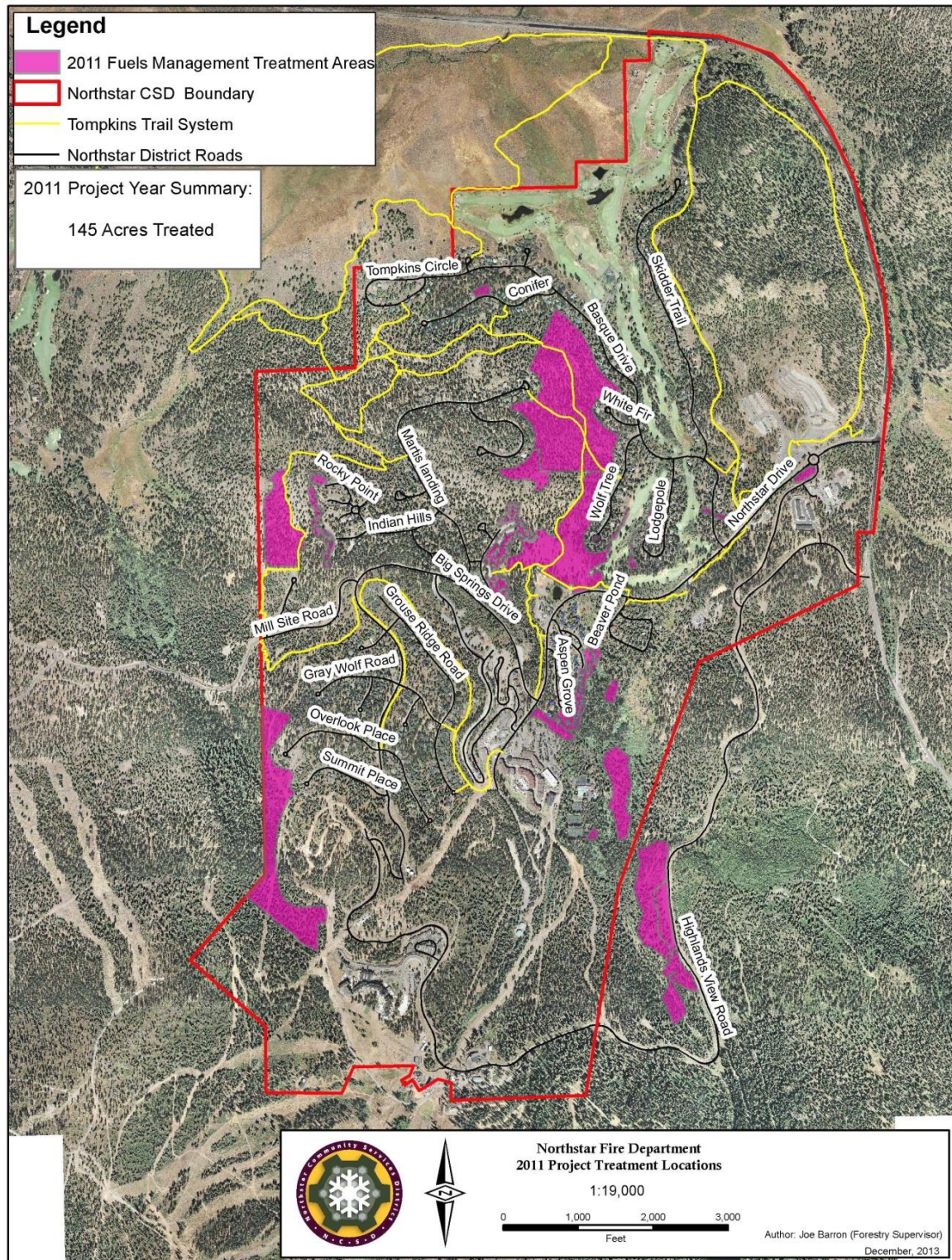
Areas in purple depict compliance fuels reduction and forest health treatment within and outside the NCSD boundary completed in 2009. Project work consisted of seedling planting, compliance work, Measure E funded work, and a Supplemental Environmental Project.



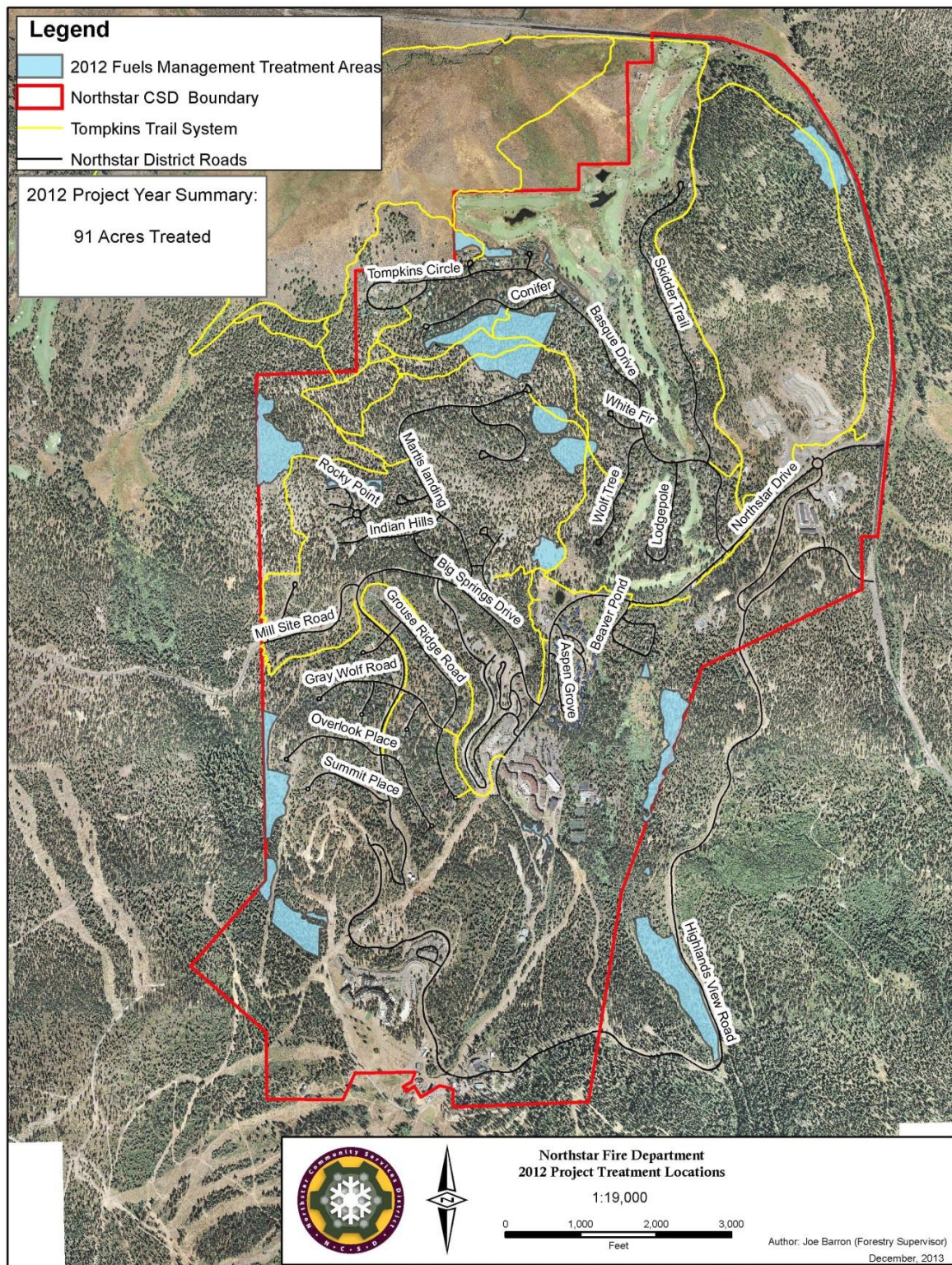
Areas in orange depict compliance fuels reduction and forest health treatment within and outside the NCSD boundary. This work completed in 2010 consisted of compliance work, Measure E-funded work and a Supplemental Environmental Project.



Areas in blue, purple and orange depict compliance fuels reduction and forest health treatments within and outside the NCSD boundary. This work completed in during 2008 through 2010 consisted of federal funded projects, compliance work, Measure E-funded work and a Supplemental Environmental Project.

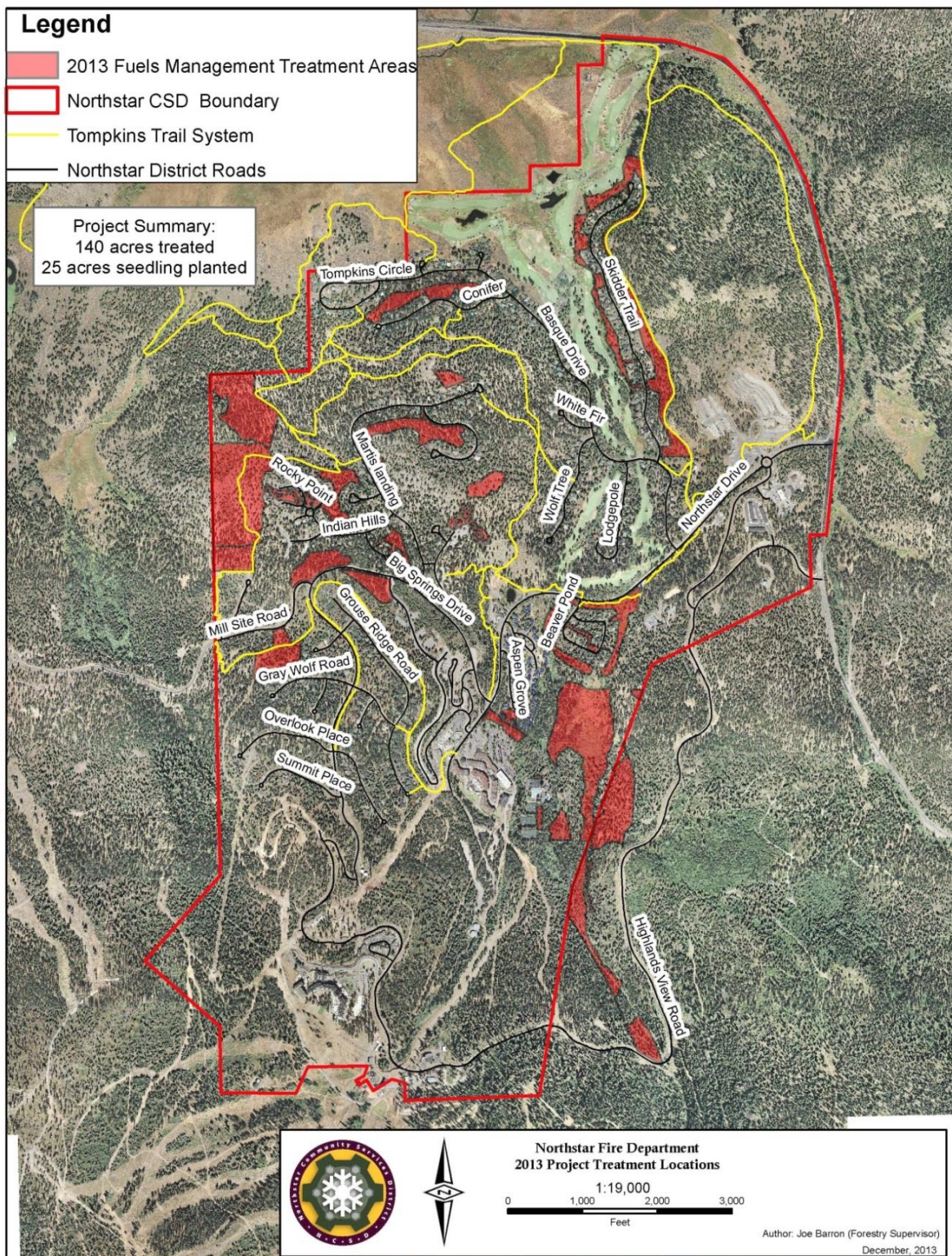


Areas in pink depict compliance fuels reduction and forest health treatment within and outside the NCSD boundary. This work completed in 2011 consisted of federally funded work, compliance work, Measure E-funded work and a Supplemental Environmental Project.

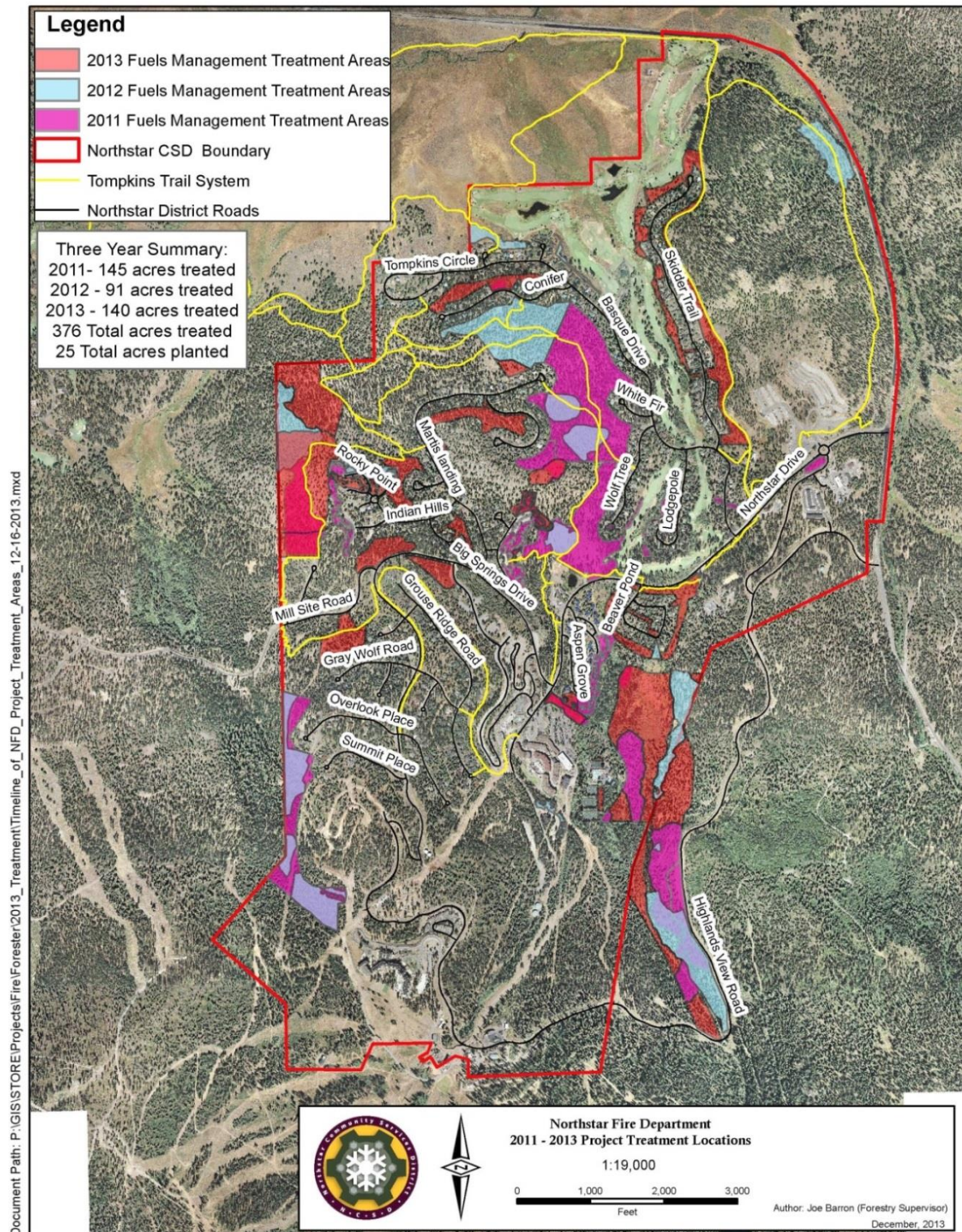


Areas in light blue depict fuels reduction and forest health treatments within and outside the NCSD boundary, and completed in 2012. Project work consisted of compliance work, and State of California funded work.

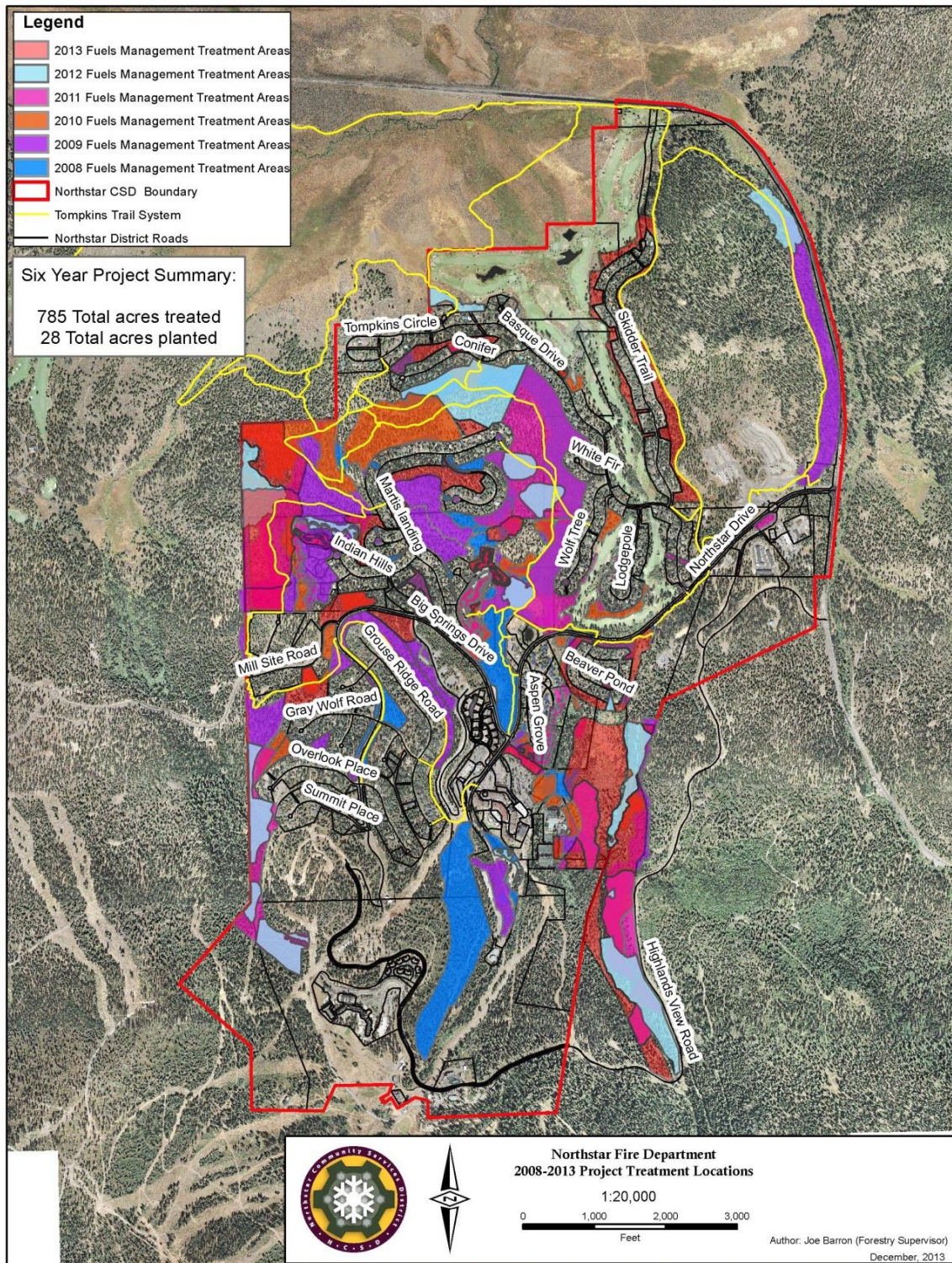
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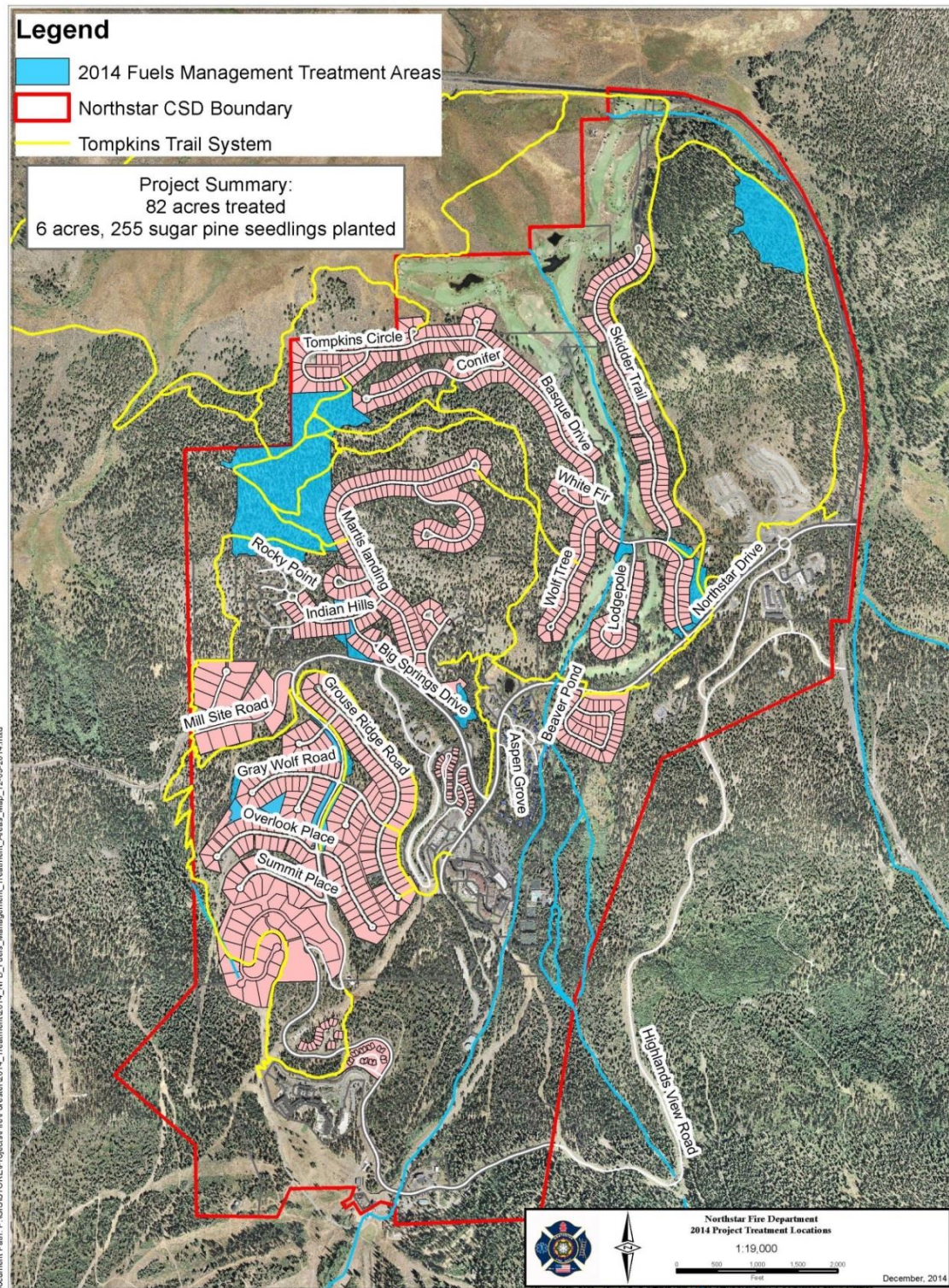
Areas in red depict fuels reduction and forest health treatments within and outside the NCSD boundary, and completed in 2013. Project work consisted of seedling planting, compliance work, State and federally funded work, in addition to a Supplemental Environmental Project.



Areas in light red, light blue and pink depict seedling planting, compliance fuels reduction and forest health treatment within the NCSD boundary completed from 2011-2013. Project work consisted of compliance work, Measure E, State and federally funded work in addition to a Supplemental Environmental Project.



The polygons within the aerial photo map depict compliance fuels reduction and forest health treatments within the NCSD boundary completed from 2008-2013. Project work consisted of seedling planting, compliance work, Measure E, State and federally funded work in addition to a Supplemental Environmental Project.



Areas in blue depict fuels reduction and forest health treatments within and outside the NCSD boundary that was completed in 2014. Project work consisted of seedling plantings; Measure E fuels reduction work, and a California Fire Safe Council fuels reduction project.

APPENDIX H – PHOTOGRAPHIC DOCUMENTATION



The photos above demonstrate the forest floor and stand density on Northstar Property Owners Association (NPOA) property prior to treatment in 2008. Prior to work being done the BEHAVE fuel model number assigned to this site (Timber Group) = 10. Following treatment the BEHAVE fuel model was recognized as an (Timber Group) = 8. The average stand density for the entire 7.63 acre project was 270 square feet of basal area. Following treatment the average square feet of basal area of the stand was 150. Additional work will be done in future years to get the desired square foot of basal area between 75 and 90.

During Treatment



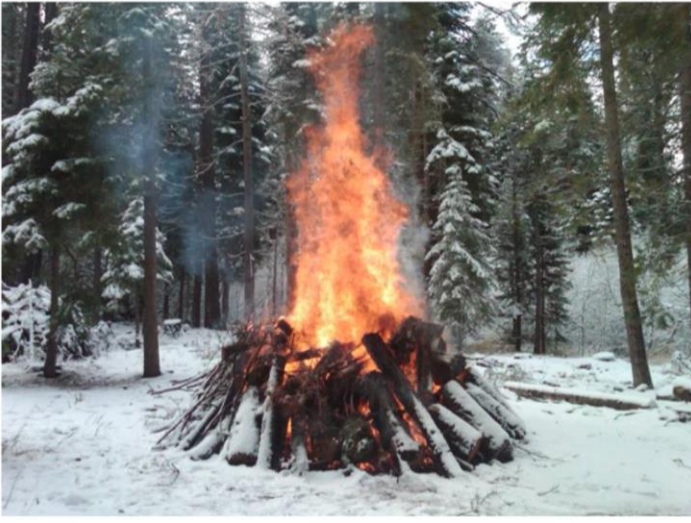
The photo above shows the large downed and dead material from the previous photo stacked into burn piles. Larger material that cannot fit into the track chipper or is logistically difficult to reach is pile burned. The re-introduction of fire to the ecosystem is a beneficial element to the Sierra Nevada forest ecosystem.

During Treatment



A track chipper is used in areas where chipping is acceptable. The operator manages a two man crew that on average can chip 30 4'x4'x6' piles per day.

Pile Burning Following Treatment



Annual pile burning has been performed since 2008. It is primarily performed late fall until early spring. Burn piles that are created are typically 8' x 8' in size and consist of material that was unable to be chipped or located on steep slopes where equipment could not operate. The piles are covered in the fall, and ignited with a product called Alum-A-Gel and or a drip torch consisting of a proportion of diesel fuel and gasoline. The piles are monitored, consolidated and extinguished at the proper time. This is an easy and cost effective way to treat larger fuels.

Project Work Following Treatment



The photo's above and below shows a Quaking Aspen (*Populus tremuloides*) grove that was opened and released from encroaching conifers.

